UNIVERSITY OF ARIZONA
39001007444402

Plums and Plum Culture

F. A. Waugh

PLUMS

and PLUM CULTURE

A monograph of the Plums Cultivated and indige nous in North America With a complete account of their propagation cultivation and utilization

By F. A. WAUGH

ILLUSTRATED

NEW YORK
ORANGE JUDD COMPANY
NINETEEN HUNDRED AND ONE

Copyright
Nineteen Hundred and One by
F. A WAUGH

634.22
W35p

TABLE OF CONTENTS

PART I

Description, Nomenclature and Classification

CHAPTER I

PAGES

SYSTEMATIC POMOLOGY AND THE PLUMS 1-8
The modern neglect of systematic pomology—The subdivisions of systematic pomology—How to describe fruits—Blank forms—Naming fruits—Nomenclature—Concerning rules—The Lazy Club rules for pomological nomenclature—The classification of varieties—Pomological and botanical types—The application of these principles in this book.

CHAPTER II

PLUM BOTANY 9-19
Plum growers are mostly botanists—the basis of botanical judgments—Botanical classification the foundation of horticultural classification of plums—Botanical science not infallible—The genus *Prunus*—*Rosaceae* vs. *Drupaceae*—Names and descriptions of species and botanical varieties.

CHAPTER III

THE DOMESTICA PLUMS 20-29
Origin and wanderings—Introduction into Europe—Several types—The Reine Claude, or Green Gage

10792

PAGES

group—The Dame Aubert type—The Prunes—The Perdrigons—The Diamond type—The Bradshaw type—The Lombard type—The Russian varieties—The Domesticas are highly ameliorated—The adaptations—Their future.

CHAPTER IV

THE DAMSONS 30-33
Their relation to the Domesticas—Their separateness—Their history—Possible genesis—The Bullace—The Damsons in cultivation—They come nearly true from seed.

CHAPTER V

THE MYROBALAN PLUMS 35-37
Marianna not the best type—Myrobalan an offshoot of *Prunus domestica*—Varieties of this group—Marianna and others in the orchard—Pissard—The Myrobalan in hybridization.

CHAPTER VI

THE SIMON PLUM 38-41
Introduction to America—Origin—History—Botanical status—Commercial standing—Value in hybridizing—The future.

CHAPTER VII

THE JAPANESE PLUMS 42-47
History of their introduction—The first trees—Nativity — In Europe — Popularity in America — Importance — Characters — Blossoming — Hardiness—Their future.

CHAPTER VIII

THE AMERICANA GROUP 48-54
The most prominent American type—Largely grown in the orchard—Natural range—Commercial range—Natural habitat—Pomological characteristics—Peculiarities of the flowers—The fruit—Quality—Clingstones—Salability—Productiveness—Too many varieties.

CHAPTER IX

THE NIGRA GROUP 55-57
Importance—Botanical history—The author's view—Pomological standing of the group—Distinguishing characters—Pomological characteristics.

CHAPTER X

PAGES

THE MINER GROUP 58-59
Pomological importance—Botanical position—*Prunus hortulana mineri*—Probable mongrel origin—Characters—Hardiness.

CHAPTER XI

THE WAYLAND GROUP 60-66
History of the treatment of this group—Its name—*Prunus rivularis*—Origin of the varieties geographically considered—Genealogy of the group—Identity of the group with *Prunus rivularis*—Pomological characters—Distinctness—Adaptations.

CHAPTER XII

THE WILDGOOSE GROUP 67-69
History of *Prunus hortulana*—Characterization—Botanical position—The present view of *Prunus hortulana*—Popularity of the varieties—Blossoming.

CHAPTER XIII

THE CHICASAWS 70-73
Geographical range—Possible nativity—Wild characters—Blooming—The fruit—Uses—The species in cultivation.

CHAPTER XIV

THE SAND PLUM 74-78
Personal paragraph—Description—The fruit—Natural range—The Sand plum in a Kansas garden—Named varieties—Behavior in cultivation.

CHAPTER XV

THE HYBRID PLUMS 79-85
The beginnings—The first monograph—Possibilities—Origin of the Hortulanas—Hybridization in nature—Hybridization in the orchard—Hybrids in groups—Tests of hybridity—Pedigree vs. external characters—Intermediateness of character—Caution—Difficulties foreseen—The classification of hybrids—Limits and affinities in crossing—The utility of various species in hybridizing.

CHAPTER XVI

PAGES

OTHER KINDS OF PLUMS 86-93
Other possibilities—The Beach plum—*Prunus injucunda*—*Prunus gravesii*—Other variations of the Beach plum—The fruit—Basset—The Pacific plum—In hybridization—Resemblance to the European plum—Sisson—The Oklahoma plum—The Alleghany plum—The southern sloe—The dwarf cherries—The choke cherries—The black cherries.

CHAPTER XVII

THE DOMESTICA PLUMS NAMED AND DESCRIBED . 94-126

CHAPTER XVIII

THE DAMSON PLUMS NAMED AND DESCRIBED . 127-131

CHAPTER XIX

THE JAPANESE PLUMS NAMED AND DESCRIBED . 132-140

CHAPTER XX

THE AMERICANA PLUMS NAMED AND DESCRIBED . 141-168

CHAPTER XXI

THE NIGRA PLUMS NAMED AND DESCRIBED . 169-171

CHAPTER XXII

THE MINER-LIKE PLUMS NAMED AND DESCRIBED . 172-176

CHAPTER XXIII

THE WAYLAND-LIKE PLUMS NAMED AND DESCRIBED 177-183

CHAPTER XXIV

THE WILDGOOSE VARIETIES NAMED AND DESCRIBED 184-191

CHAPTER XXV

THE CHICASAW PLUMS NAMED AND DESCRIBED . 192-200

CHAPTER XXVI

THE HYBRID PLUMS NAMED AND DESCRIBED . 201-228

CHAPTER XXVII

PAGES

MISCELLANEOUS AND UNCLASSIFIED VARIETIES NAMED AND DESCRIBED 229-234

PART II

Culture and Management

CHAPTER XXVIII

THE PROPAGATION OF PLUMS 235-250

Practical complications — Growing from seed—Suckers — Layers—Cuttings—Budding—Whip-grafting—Budding vs. grafting—Side-grafting—Top-working—The Various Stocks: Horse plum—St. Julien — Myrobalan — Marianna— Peach—Apricot—Americana seedlings—Chicasaws—The Sand plum—Wayland seedlings—Pacific plum—Sand cherry—Other stocks—Summary: As regards stocks—As regards scions—As regards locality.

CHAPTER XXIX

SELECTION OF VARIETIES 251-264

Personal preferences—Also prejudices—Local adaptations—Basis of selections of varieties—*Market varieties:* Market demands—Quebec, upper Ontario, northern Maine, New Hampshire and Vermont—New England, in general—New York, northern Ohio, lower Ontario, southern Michigan and central Pennsylvania—Wisconsin, Minnesota, Manitoba, Montana, the Dakotas, Iowa and northern Nebraska and Colorado—Kentucky, Indiana, Illinois, Missouri, Kansas and Colorado—Maryland and Virginia and adjacent territory—Georgia, Tennessee, Oklahoma and southward—*Varieties for home use:* Principles of selection—Specific recommendations—Selection by experiment.

CHAPTER XXX

ORCHARD AND GARDEN MANAGEMENT 265-281

Orchard and garden status of the plums—Soils—Exposures — Drainage — Planting — Cultivation — Irrigation—Pruning—Spraying—Thinning — Picking and marketing.

CHAPTER XXXI

PAGES

POLLINATION 282-307
Something new—Historical—Self-sterility—Causes of self-sterility—Defective pistils—Insufficient pollen—Difference in time of maturity between stigma and pollen—Impotency of pollen—Conclusions—Choosing varieties for pollination—Blossoming seasons—Blossoming chart—Mutual affinities—Various groups considered—Amount of pollen produced—Fruiting value—Specific recommendations—Table of pollenizers—The Domesticas and the Damsons—Agencies of pollination—The June drop—Practical conclusion.

CHAPTER XXXII

GEOGRAPHY AND CLIMATOLOGY 308-316
The relationship of the plant to its environment—Hardiness—Differences in hardiness of plums—Special investigations—Hardiness of representative varieties—Maps—Lombard and Bradshaw—The Damsons—Burbank and Kelsey—The Americana group—The Nigra group—The Wildgoose group—The Miner group—The Wayland group—The Chicasaw group—*Commercial range:* The Domesticas—The Americanas—The Wildgoose varieties—Local peculiarities—*Phenology:* Blossoming and ripening seasons—Differences in different localities.

CHAPTER XXXIII

DISEASES OF THE PLUM 317-337
Those of parasitic origin: Fruit rot—Black knot—Shot hole—Plum pockets—Scab—Rust—Fly-speck—Phoma—Powdery mildew—Lichens—Of Non-parasitic origin: Gummosis — Sunscald — Leaf curl—Single-tree disease.

CHAPTER XXXIV

INSECT AND OTHER ENEMIES OF THE PLUM . . 338-348
Curculio—Gouger—Aphis—Scale—Borers—Tent caterpillar—Canker worm—Bud moth—Red spider—Bumble flower beetle—Other insects—Mice.

CHAPTER XXXV

COOKING PLUMS 349-357
The culinary usefulness of plums—Stewing—Canning—Preserves—Spiced plums—Pickled plums—Jelly—Plum juice—Marmalade, jam, or plum butter—Drying—Uncooked plums.

CHAPTER XXXVI

PAGES

PLUM TREES AS ORNAMENTAL PLANTS 358-362

Beauty of plum trees and blossoms—Japanese love of plum blossoms—The Wayland group—Wildgoose and Chicasaw groups—Americana and Miner groups—Domestica varieties—Japanese sorts—Dwarf species—Pissard plum—Other varieties with ornamental foliage—Concerning the black knot—Selection of trees for ornamental planting—Varieties specially recommended.

LIST OF ILLUSTRATIONS

PAGE

S. D. Willard, portrait 7
J. W. Kerr, portrait 11
Blossoms of Domestica Plum, Richmond 21
Bradshaw Plum Tree 26
The Bullace 31
European Sloe 33
The Simon Plum 39
Burbank, Three-year-old Tree 44
Mr. J. W. Kerr's Opinion of the Japanese Plum . . 46
Mr. O. M. Lord of Minnesota, portrait 53
Typical Wild Tree of the Nigra Type 56
Blossoms of Miner 59
Fruit of Wyland Type of Wayland Group 65
Blossoms of Sophie 68
H. A. Terry of Iowa, portrait 71
Sand Plums 75
Luther Burbank of California, portrait 78

Varieties of Plums:

Bassett Beech 88
Oklahoma 90
Agen 95
Bleeker 97
Blue Imperatrice 97
Bradshaw 98
Columbia 99

PAGE

Varieties of Plums—Continued.

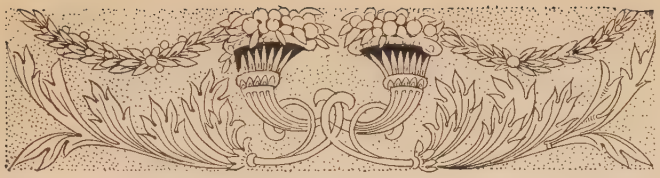
Deaton 100
Diamond 101
Duane 102
Englebert 103
Field 104
Golden Drop 104
Goliath 105
Grand Duke 106
Green Gage 107
Hand 108
Hungarian 110
Italian Prune 111
Jefferson 112
Kingston 113
Lombard 114
McLaughlin 116
Peters 118
Pond 119
Royal Tours 120
Sharp 123
Washington 125
Yellow Egg 126
Cluster Damson 128
Eugen Furst 129
Shropshire 130
Chabot 135
Maru 138
Ogon 139
Satsuma 143
Bixby 144
Champion 145
Des Moines 147
Gaylord 149
Hammer 150
Hawkeye 151
Holt 152
Kieth 155
Rockford 161
Roselle 162

PAGE

Varieties of Plums—Continued.
Smith 163
Stoddard 165
Weaver 166
Wyant 167
Cheney 170
Cumberland 178
Golden Beauty 179
Kanawha 180
Hollister 185
Milton 186
Mississippi 188
Smiley 189
African 193
Arkansas 194
Hughes 196
Newman 198
Pottawattamie 199
America 202
Apple 203
Breck 205
Climax 207
Daisy 208
Excelsior 210
Franklin 211
Golden 212
Gonzales 214
Juicy 216
Maynard 218
Nona 220
Occident 221
President 222
Ragland 223
Ruby 224
Vulcan 226
Zulu 227
Side-Grafting 240
The Dooryard Plum Tree 259
A Maryland Orchard of Wildgoose Plums . . . 266
An Irrigated Prune Orchard on the Pacific Coast . . 273

PAGE

Nursery Plum Trees 275
Plum Tree Two Years Old 276
Diagram of Northern Limit of Lombard and Bradshaw Plums 311
Diagram of Northern Limit of Burbank and Kelsey Plums 312
Diagram of Northern Limit of Wildgoose and Other Plums 313
Shot-hole Fungus 324
Plum Scab 327
Sunscald of Plum Tree 330
Canker of Branches of Satsuma 334
Single-tree Disease 337
The Plum Curculio Magnified 339
Johnson's Curculio Catcher 341
Frame for Curculio Catcher 342
The Plum Lecanium Scale 344
Double Blossoms of Americana Plum 361



PREFACE

The principal reasons why Downing's great book will never be revised are these: First, the list of varieties known and grown in America is so great that one man cannot have an intimate knowledge of them all. Second, their local variations and adaptations are so multitudinous, now that horticulture has spread over the whole expanse of the continent, that each variety requires a more critical study than before. For these two reasons the various groups of fruits must hereafter be handled by specialists. Third, if all these variety notes could be collected into one work it would require several volumes to contain them. Fourth, fruit growers of to-day demand a more extended discussion of the matters of practice than was given by Downing; and this again requires additional space and further expert knowledge. Fifth, fruit growing is becoming more and more specialized, so that the man who grows pears does not care for a treatise on plums nor the plum crank much for a book about pears.

Among the specialists in the different lines of pomology no one lot exhibits more ardor, enthusiasm, or *esprit de corps* than the self-styled "plum cranks."

Their attitude toward themselves and the rest of the world is rather refreshing and considerably significant.

Under the circumstances the publication of a book on plums could not be long delayed.

Plum growing as a special business is being rapidly extended. Iowa, which a few years ago was outside the plum belt, now estimates her average annual crop at 300,000 bushels. In other states the increased production is equally remarkable.

Plum growing for home consumption has also increased at a wonderful rate. There are still hundreds of families in every county who do not have plums enough to eat. There probably always will be; but their number is decreasing.

One of the principal reasons for the extension of plum culture, both commercially and domestically, lies in the recent introduction of several new species of plums from Asia and the American woods. These have changed the whole face of plum pomology in this country, and have put all the earlier literature of the subject out of date.

The introduction of these several new species and of hundreds of new varieties naturally complicates the subject enormously. The pomology of plums is in fact the most intricate branch of American horticulture to-day. "To the student," says Professor Bailey, "our native and domestic plum flora will long remain the most inviting, perplexed and virgin field in American pomology."

A word must be said about the Pacific coast. Perhaps the largest plum growing interests on the continent face the setting sun. Yet, pomologically speaking, Washington, Oregon and California belong rather to Europe than to North America. Their grape culture and their plum culture are alike European, and are of no interest to the country east of the Rocky

Mountains, except as their fruits compete with ours in the markets. A discussion of California plum culture would be out of place in this book, and would be the more useless as the field is covered by Californian books, published in California and written by Californians.

The pomologist who endeavors to make use of those chapters in which varieties are named and described will soon discover a certain lack of uniformity in the treatment. In the chapters describing the native plums considerable effort is made to name every variety which has ever been put before the horticultural public; whereas from the chapter naming and describing the Domestica plums a large number of varieties have been omitted. I am sure that this will appear, on reflection, to be excusable. The native varieties are all new, the facts of their origin and distribution are often undiscoverable, there are few authoritative descriptions of them accessible, and even the spelling of the names is often in doubt. The list of native plums is certainly too long at the present time, and many of the varieties named in this book should be discarded at once. Perhaps for this very reason it is the more desirable that their names, histories and descriptions should be first collected and put on record.

The Domesticas, on the other hand, have been before the public ever since there was any horticulture in America. All the old varieties are described in Coxe, Manning, Prince, Downing, Barry, Thomas and the other fruit books. The student bent on research can always find those descriptions. But many of the varieties themselves have been repeatedly tested and found wanting. They have been finally and permanently discarded from American pomology. There is no need of putting into this book the descrip-

tion of a plum which has had its turn and is practically lost. This is why some greater liberty has been taken with the list of Domesticas. Doubtless some varieties have been included which are not really in cultivation, and perhaps a few have been excluded which are still to be found, but the author hopes that no serious oversights of this sort have occurred.

The author wishes to acknowledge his deep sense of gratitude to the whole fraternity of plum men for the interest they have taken in his work and the material help they have given him. Without their hearty co-operation this book might have been much worse. It is impossible to thank them all by name, for their name is legion. Nevertheless the author is sincerely grateful to them for their help.

Rather more than usual pains have been taken to make this work accurate, authoritative and up-to-date. The author, under the direction of the Vermont Experiment station, whose sympathetic support he wishes especially to acknowledge, has for several years devoted himself continuously to the study of plums on every side. The various parts of this book have been subjected to the criticism of experts. All the descriptions have been edited by Mr. J. W. Kerr, who needs no introduction here. The chapter on plum botany has been gone over by Professor L. R. Jones of the University of Vermont, and by Dr. W. W. Rowlee of the Cornell University. The chapter on propagation has been reviewed by Professor John Craig and by Mr. J. W. Kerr. The latter gentleman has also edited the chapter which discusses plum trees as ornamental plants, the chapter on propagation, and several others. The chapter on plum diseases has been revised by Professor L. R. Jones, and the one on plum insects by Professor M. V. Slingerland of the Cornell University. The chapter on cooking plums

was dictated by a lady of education and experience in this line, and was reviewed by Miss Gertrude Coburn, professor of domestic economy in Iowa State College. Finally the whole manuscript was read by Professor L. H. Bailey. Moreover the proofs of the various chapters have been sent to different persons possessing special knowledge of the subjects treated and considerable help has been secured in this way.

The illustrations in this book are, with a very few exceptions, from photographs by the author. In all cases where varieties are illustrated the reproductions show the exact size of the fruit. Readers should remember, however, that such pictures always look smaller than the objects from which they are taken.

Finally, the author has no notion that this book is perfect. There are undoubtedly some mistakes in it. If readers will kindly point these out they will be corrected in future editions.

F. A. WAUGH.

University of Vermont,
Experiment Station.

PLUMS AND PLUM CULTURE

I

Systematic Pomology and the Plums

IN the last fifty years, and more especially in the last decade, scientific knowledge and horticultural practice, marching hand in hand, have made phenomenal progress. Systematic pomology, however, has remained pretty much where it was left by the Downings and by the others of that coterie of noble men who founded the American Pomological society, and who first gave form to any branch of horticultural knowledge in America. This will be perfectly, almost painfully, clear when we remember that, whereas Downing's discussions of insect pests and fruit-tree diseases are now as useless as Ben Franklin's printing press, his descrip-

tions of varieties are still copied far and wide. (Some of them are copied into this book!)

The patient reader and student of plums should bear in mind that systematic pomology comprises three distinct divisions, as follows: (*a*) description, (*b*) nomenclature, (*c*) classification. Varieties must first be described; next, the correct names must be determined; and, lastly, we may attempt some classification. All three of these lines have fallen into neglect in this country since the days of Wilder, Downing and Warder, but especially the first two,—description and nomenclature. We need a revival of interest in these lines.

In describing fruits it is highly convenient to have a blank form. This not only gives, at a glance, the various points which have to be covered in the description, but it insures greater accuracy and uniformity. Furthermore, the fact that convenient blanks are at hand leads the fruit man to make descriptions of many interesting new fruits of which he would otherwise retain no notes. Every real lover of pomology ought to keep descriptive notes of varieties which come to his notice, either fruiting in his own orchard, sent to him by correspondents, or seen at fruit exhibitions. The blank form used by the author and found in experience to be very convenient, is shown herewith:

WOOD—

Fruit: *Received from A. B. Dennis, Ia.*

flavor, *sweetish*	form, *heart-shaped*
size, *medium, 30x31 mm*	cavity, *deep, flaring*
stem, *short, slender*	suture, *a line*
apex, *pointed*	color, *orange, with crimson*
bloom, *light blue*	dots, *many, minute, white*
flesh, *yellow*	skin, *tough*
quality, *good*	stone, *oval, flat, cling*

General notes: *Described by W. D. G., Sept. 2, 1899.* Plum. *Americana* Group.

These blanks are printed on strong, stiff paper, and carefully cut to $5\frac{1}{2}$x$8\frac{1}{2}$ inches. They are then kept in a cabinet drawer made to fit them, and arranged in alphabetical order, in groups, just as a library card index is arranged. Other blank sheets of the same size are used for pasting up catalog descriptions, newspaper notices and everything else referring to varieties. If a letter is received telling the history of some plum, or giving notes of its behavior, the letter is slipped into an envelope and mounted on a sheet in the same way. Photographs, half-tone engravings, and everything else of interest, goes into the same cabinet, so that all the notes on Wickson, Spaulding or Miner can be found in a moment and all in the same place.

The varieties are arranged by groups, following the system of classification used in this book.

The same form is also made up in notebook style for field use.

The determination of the correct name for a variety is sometimes a matter of considerable difficulty. A simple, stable, unequivocal nomenclature is of very great importance to scientific pomology, yet it is a branch of study which has been sadly neglected by the horticulturists.

The first necessity is that a simple system of rules must be agreed upon; for, though the fundamental rules of nomenclature are really axiomatic, their application may vary somewhat in detail. Most of the rules generally advocated are merely suggestions for naming new fruits. This is true of the first three out of the four rules now on the statute books of the American Pomological society. The actual practice of the present-day working horticulturists, however, is certainly better represented by the so-called "Lazy club rules," proposed for discussion by the Horticulturist's Lazy club of Cornell university. These rules have no

authority except the indorsement of the Lazy club; but the final adoption of a very similar code by some authoritative convention of American horticulturists seems to the writer to be inevitable. These are, in fact, the rules which have controlled the nomenclature in this book; and for that reason, as well as because they will prove generally useful to plum students, the rules are herewith reproduced in full.

LAZY CLUB CODE FOR POMOLOGICAL NOMENCLATURE

FORM OF NAMES

1. The name of a variety of fruit shall consist of one word, or at most of two words.

In selecting names, simplicity, distinctiveness and convenience are of paramount importance. Pitmaston Green Gage and Louise Bonne de Jersey are neither simple nor convenient. Gold, Golden, Golden Drop, Golden Beauty, Golden Queen and Golden Prune, all given to different varieties of plums, are not distinctive.

The use of such general terms as seedling, hybrid, pippin, buerre, damson, etc., is not admissible.

Nouns must not be used in the possessive form. McIntosh's Red, Crawford's Early, Bubach's No. 5 must be written McIntosh, Crawford and Bubach.

Numbers are to be considered as temporary expedients to be used while the variety is under trial.

The name of no living horticulturist should be applied to a variety without his full consent; and the name of no deceased horticulturist should be used without the general agreement of living horticulturists.

An author publishing a new variety should use the name given by the originator, or by the introducer, or else should choose the oldest discoverable local name, providing such name may be conformed to these rules without loss of identity.

2. In the full and formal citation of a variety name, the name of the author who first published it shall also be given.

Names would then take such forms as the following: Summer Queen, *Coxe;* or Henry (Jerolaman); or Sophie (J. W. Kerr, Cat. 1894); or America, Burbank, *New Creations,* 1898, p. 5.

It is expected that such citations of names will be used only in elaborate works on pomology, in scientific publications, or in cases where they are necessary for clear discrimination of synonyms.

PRIORITY

3. No two varieties in the same group shall have the same name, and the name first published for a variety must always be used to designate it. All names subsequently published must stand as synonyms.

The term "group" as here used shall be held to designate the large general groups specified by words in common language, such as raspberry, plum, apricot.

PUBLICATION

4. Publication consists in (*a*) the public distribution of a printed name and description, the latter giving distinguishing characters of fruit, tree, etc., or (*b*) in the publication of a new name for a variety properly described elsewhere.

Such a publication may be made in any book, bulletin, report, trade catalogue or periodical, providing the issue bears the date of its publication, and is generally distributed among nurserymen, fruit-growers and horticulturists.

REVISION

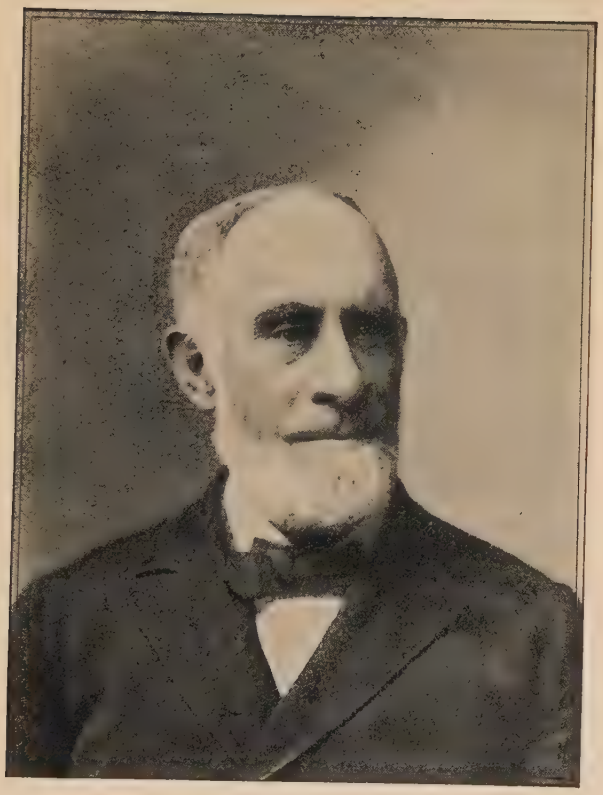
5. No one is authorized to change a name for any reason except when it conflicts with these rules.

Having now arranged for a system of nomenclature, we come to the matter of classification. There are some deep, abstruse principles underlying the whole theory of classification which, fortunately, it is impossible to take up in a work like this. In the matter of plum classification, we have practically but one method in use in this country. Even as to the details of carrying out this method there is a somewhat remarkable agreement among American plum stu-

dents, considering the natural complications presented by the plums themselves.

This method might be termed the group or type method, because it collects the varieties into natural groups according to the more striking types which they present. As these types are the same ones sought out by the botanist, it follows that our horticultural groups of varieties among plums correspond almost exactly to the botanical groups. Our pomological classification is founded directly upon botanical classification. This group method was given its first impetus by Professor Bailey when he used it in his Bulletin 38, in 1892. Since then it has been followed by everyone, including all the leading nurserymen, and the classification originally proposed has been developed and slightly—but only slightly—modified to agree with our advancing knowledge of plums. The same method of classification is followed in this book.

The application in this book of the notions of description, nomenclature and classification here set forth has been as exact as circumstances would permit. Taking up these points in the reverse order, the author may call attention to the fact that he has given special attention to the study of plum classification for several years past and has published a number of articles on the subject. The matter of nomenclature has likewise engaged his personal attention, and he was a member of the committee which drafted the Lazy Club rules. The descriptions given in this book are for the most part made by the author from specimens. In most doubtful cases great pains have been taken to secure authentic material and to compare specimens from one locality with those from another. In a few cases descriptions have been furnished by friends and correspondents. A small number of descriptions of old and rare varieties in the Domestica group have been



S. D. WILLARD of Geneva, N. Y.
A leading plum grower of the United States

adapted from Downing. In the Japanese group, the publications of the Cornell experiment station, embodying the work of Professor Bailey and Mr. Hunn, have been freely drawn upon. In the list of hybrid varieties, the descriptive notes published by the author in the reports of the Vermont experiment station have been largely used. Where descriptions are taken from literature their source is indicated.

In following the outline of description shown at the beginning of this chapter, some allowance has to be made, of course, for personal judgment. This shows itself particularly in defining such characters as quality and flavor. The standard of size, too, must be allowed to vary somewhat. What is large in the Chicasaw group would be small among the Domesticas or the hybrids. Similarly, what would be a thick skin on a Chicasaw would be very thin on an Americana. One must keep these points in mind in interpreting the following descriptions. He should remember, too, that all points have not equal value in determining the correctness of a variety. For instance, flavor, quality and size vary greatly with different soils, climates, methods of cultivation, etc. Even color, the one characteristic most emphasized in catalog descriptions, is more apt to vary than is the shape of the stone, or the character of the dots. These two points are probably of greatest importance in determining varieties. After these, the others come about in the following order: Form, color, cavity, bloom and stem.

II

Plum Botany

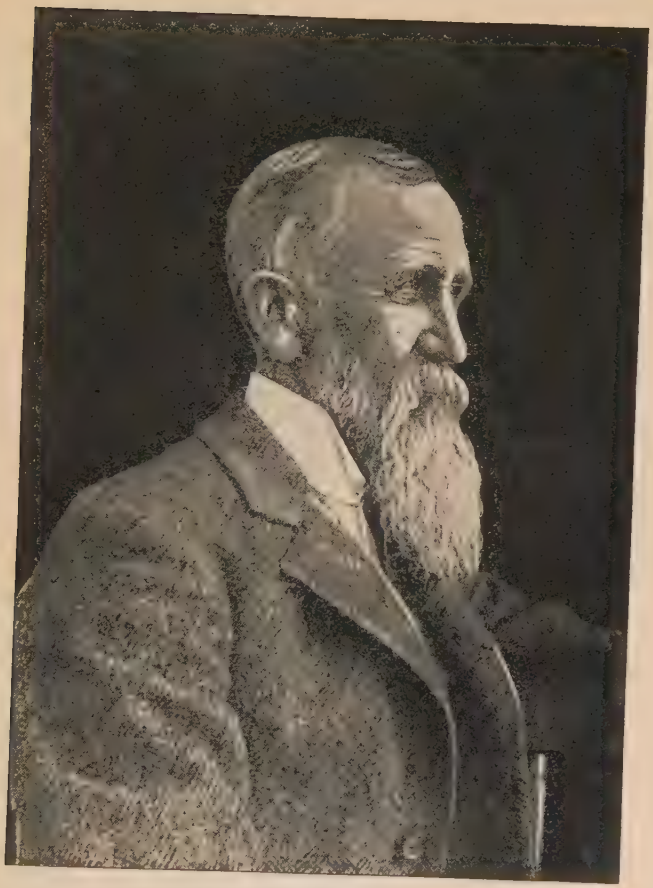
THE plum enthusiasts of America are mostly good botanists. This is necessary from the fact that we have so many species of plums in cultivation. Moreover, these species are variable, very difficult for the best botanists to discriminate, and now that they are being blended and compounded by hybridization, it requires the closest study and the most intimate acquaintance to know one from another. This knowledge is best gained in the nursery and the orchard, where the horticulturist lives with the multitudinous cultivated varieties. Such knowledge, as anyone can see, is vastly superior to that which the botanist can possibly secure from his dried specimens. Thus it has come about that the horticulturists have practically

taken the study of the plums out of the hands of the botanists. They have been obliged to do it.

I have often heard good plum horticulturists say, in speaking of the classification of varieties, that it seemed to them that such and such a disposition ought to be made, but that perhaps a botanist would think differently. The man who says that gives unmerited flattery to the botanist and misunderstands his own position. The botanist has no secret key to classification. He knows nothing about a given specimen except what he sees. If he is a trained botanist he sees more than the untrained man in the street; but even the best botanist cannot see so much in a plum as the horticulturist who has watched it year in and year out, in nursery and orchard, has seen it grow and blossom and bear fruit. I have found some plum cranks who have never been to college except in the plum orchard, and who offer their opinions very diffidently, but who have a fine sense of discernment when it comes to questions of varieties, their distinctions and classifications. Such men ought to appreciate that they are really botanists within their own field, just as much as the man who writes Ph. D. after his name.

Everyone who knows about the present position of plum knowledge in this country will see how important it is in a work like the present to take up the strictly botanical side of plum classification. If the practical plum grower will understand the argument offered above, that he is himself a botanist in so far as he has any personal knowledge of plums, he will perhaps be more ready still to take an interest in this necessary chapter which describes the various species and botanical varieties.

This is the basis of our horticultural classification, Those men who have such strange notions of the



J. W. KERR of Maryland

One of the most prominent authorities on native and Japanese plums

botanist's powers imagine also that he has some secret and sure formula for telling one species from another. Science ought to be exact, they think, and the scientist who describes, names and classifies species ought to be able to tell exactly whether a given specimen or a given variety belongs in this species or that. And such men are suprised when botanists disagree.

But botanical science is not exact, and never can be. The botanist simply has to depend on his judgment as to whether two varieties belong in the same species or not; and his judgment may be either better or worse than the judgment of the man who propagates Wildgoose and Burbank in his nursery. The trouble is that the plums will not conform themselves to the botanist's descriptions!

Plums grow pretty much as they please, and the botanist has to take them as he finds them. Something new is all the while coming up and disarranging the old descriptions and classifications that we have made. And then we have to make new ones. That is the way botany grows. That is the way, too, that pomology grows. We ought to be glad that they are growing sciences, and not dead ones.

In the following botanical review, descriptions are given of the principal species of plums which have been cultivated either for fruit or for ornament. As the number of known species runs up into the hundreds, however, and as nearly all of them bear fruit in some degree edible, it will be seen that a complete review of plum botany is not practicable here. Along with the plums proper it is thought best to describe the principal American species of the choke-cherry group (section *Padus*), as these are more or less propagated, cultivated and handled by the catholic-minded plum specialists of this country, and are especially useful in hybridization.

The older botanies in use in this country mostly include in the genus *Prunus* all the peaches, cherries and plums, after the plan of Bentham & Hooker. In the more recent publications, however, there is a manifest tendency to return to the earlier classification which puts these different fruits into two, or even three, separate genera. In the view of the present writer, the latter disposition is the better. It does not, however, affect the treatment to be given the plums in this book, since here we shall be concerned with the plums only, which are included by all botanists in the genus *Prunus*.

Similarly the older American botanies, still following Bentham & Hooker, refer this aggregate genus *Prunus* to the family *Rosaceae*, while later publications in this country put the plums in another family called *Drupaceae*. This change also seems an improvement, and will be followed here.

We are now ready to proceed with the botanical descriptions, names and classifications.

Family, DRUPACEAE, DC.—Trees or shrubs with alternate, petiolate, serrate leaves, the small stipules early deciduous, the teeth and petiole often glandular. Flowers in corymbs, umbels, racemes or solitary, regular and nearly always perfect. Calyx inferior, mostly early deciduous, free from the ovary five-lobed. Disk annular. Calyx lobes imbricated in the bud. Petals, five, inserted on the calyx. Stamens numerous, inserted on the calyx at the base of the petals. Pistil nearly always single, with two ovules, only one of which normally develops; style simple; stigma mostly small, capitate. Fruit, a drupe. The bark of most species exudes gum, and the leaves, bark and seeds contain prussic acid, making them bitter. There are about six genera and over one hundred species, the majority of which grow in the north temperate zone.

Genus, PRUNUS, Linn.—Trees or shrubs, mostly with edible fruits; flowers, white or pink, with spreading petals. Stamens, 15-30, distinct, with filiform filaments. Style, terminal; stigma, usually truncate. The fruit with a fleshy exterior, glabrous, and containing a hard bony pit, which in turn contains the seed. There are about ninety species of the genus as here defined.

PLUMS PROPER

EUROPEAN OR ASIATIC SPECIES

PRUNUS DOMESTICA Linn.—The European or common garden plum. Flowers showy, white, more or less fascicled; leaves large, ovate or obovate, usually firm and thick in texture, very rugose, usually pubescent beneath, coarsely serrate; shoots usually downy; fruit very various, of many shapes and flavors, but mostly globular-pointed or oblong, the stone large and slightly roughened or pitted. Represented in such varieties as Lombard, Green Gage, Goliath, etc.

PRUNUS DOMESTICA DAMASCENA Linn.—The Damson plums. Usually somewhat dwarfer than the foregoing, with shorter jointed, slightly spinescent branches; leaves smaller, ovate or obovate, more sharply serrate; fruit small, sour. The Bullace (*Prunus insititia* Linn., or *P. spinosa insititia* Gray) belongs here.

PRUNUS CERASIFERA Ehrh.—*P. domestica myrobalan* Linn. The Myrobalan or Cherry plum differs from *Prunus domestica* in a more slender habit, often thorny; flowers mostly smaller; leaves smaller, thin, smooth and finely and closely serrate; fruit globular and cherry-like, ranging from the size of a large cherry to over an inch in diameter, with a depression about the stem, in various shades of red or yellow. In this country used mostly for stocks.

PRUNUS SPINOSA Linn.—European sloe or blackthorn. A low, bushy shrub or small tree, resembling the Damson, but more spiny, with smaller leaves, flowers and fruits. The fruits are rather often borne in pairs, sometimes even in threes, and are small, black and very sour.

PRUNUS TRIFLORA Roxb.—The Japanese plum. A strong growing tree, perhaps native to China, numerous varieties of which have recently been disseminated in the United States. Flowers usually densely fascicled; leaves and shoots smooth and hard, the former obovate or oblong-obovate, prominently pointed and finely and evenly serrate; fruit usually conspicuously pointed, red, yellow or purple, with a very firm flesh and commonly a small stone. Represented with us in such varieties as Abundance, Burbank, Ogon and Satsuma.

PRUNUS SIMONII Carr.—Apricot plum, or Simon plum. A rather small, straight-growing tree, with pinkish-white flowers, borne singly or in pairs; leaves oblong-lanceolate, thick and firm, dull, conduplicate, closely serrate; fruit oblate, maroon-red, yellow flesh, firm, with a very short stem, with a roundish, spongy, roughened pit. Not uncommon in cultivation in this country. Native to China.

AMERICAN SPECIES

PRUNUS AMERICANA Marsh.—The American wild plum of the central states. The type distinguished by entire calyx lobes, which are pubescent on the inner surface, stone turgid; leaves oval, or slightly obovate; petioles mostly without glands. Tree spreading, ragged, thorny, 8-20 feet high; flowers large, white, on slender pedicels; leaves very coarsely veined, never glossy or shining; fruit more or less flattened upon the sides, firm and meaty, the skin tough and glaucous and never glossy, ripening through yellow to red. Occurs wild from New Jersey and Ohio to Montana and Colorado. It varies southward, in Texas and New Mexico represented mostly by the variety *mollis*. Represented in such varieties as De Soto, Weaver, Hawkeye and Stoddard.

PRUNUS AMERICANA NIGRA Waugh.—Canada plum. In its extreme forms easily distinguished by the glandular-serrate calyx lobes, glabrous on the inner surface; compressed stone; broadly obconic, dark red on the outer and bright red on the two glands. Flowers large, white, with short, thick peduncles conspicuously marked by the scars left by the falling of the bud scales; pedicels dark red, slender, glabrous; calyx tube broadly obconic, dark red on the outer and bright red on the inner surface; fruit oblong-oval, orange-red; stone nearly oval, compressed. Occurs wild from Newfoundland west to Rainy and Assiniboine rivers in Canada, and commonly in the New England states, where it is found along roadsides and in waste places. Best represented in cultivation by the varieties, Cheney and Aitkin.

PRUNUS AMERICANA MOLLIS Torrey and Gray.—Woolly-leaf plum. This form has the leaves and pedicels, and sometimes the young branchlets, pubescent. The fruit is usually small, sour and late. Occurs occasionally as far north as Iowa, mixed with the ordinary form of *Prunus americana,* but is more common southward, especially in Texas.

The MINER GROUP Bailey. *Prunus hortulana mineri*, Bailey.—The Miner-like plums. An ill-defined group, standing between *Prunus americana* and the Wildgoose group below; most closely resembling the former, but doubtless more or less hybridized with the latter. Leaves dull and thick, with medium-sized, regular, somewhat appressed serrations; fruit hard, marked with conspicuous dots; stone usually more or less turgid.

The WAYLAND GROUP, Waugh.—*Prunus rivularis* Scheele. *Prunus hortulana* Bailey in part. The Wildgoose group, Bailey, in part. The Wayland-like varieties. Trees fairly strong growers, with long, smooth, bending, willowy branches, the bark usually dark colored; leaves, large

to very large oval, or sometimes slightly obovate, with taper points, glabrous above and finely tomentose beneath, especially on the larger veins, margins rather finely appressed-serrate, petioles with two to six glands; flowers appearing comparatively late, in long dense clusters of characteristic form. The buds are especially characteristic; clear white; fruit usually strikingly spherical, or only a trifle ovoid or ellipsoid, medium size, either bright transparent cherry red or else whitish transparent yellow, quite different from the opaque yellow of Kelsey or Golden Drop; dots usually large, whitish and conspicuous, bloom white, stone medium size, rather turgid, cling. The quality averages high. The flesh is almost always very firm and meaty. Represented in such varieties as Wayland and Golden Beauty. This group is somewhat numerously represented by plums growing wild in western Texas. They may be regarded as hybrids between forms of the Chicasaw and the Americana plums.

The Wildgoose Group, Bailey. *Prunus hortulana,* Bailey, in part. The Wildgoose plums. Strong, wide-spreading, small trees, with smooth, straight twigs, and a peach-like habit; flowers rather small, often very short-stalked; leaves narrow-ovate or ovate-lanceolate, thin and firm, flat, more or less peach-like, smooth and shining, closely glandular-serrate; fruit spherical, bright colored and glossy, lemon yellow or brilliant red, the bloom very thin, juicy, with a clinging, turgid and roughish, small, pointed stone. Occurs wild in various parts of the Mississippi valley, especially in the neighborhood of St. Louis. Represented by Wildgoose, Milton, Downing, and other cultivated varieties.

Prunus angustifolia Marsh.—*P. chicasa* Michx. The Chicasaw plum. Slender tree, 12-20 feet high, slender, zigzaged twigs; smaller, lanceolate or oblong-lanceolate leaves which are very closely and finely serrate, shining and trough-like; fruit small, very early, red or rarely yellow, the skin thin and shining and covered with many small, light dots and a very thin bloom; the flesh soft and juicy, often stringy, closely clinging to the small, broad, roughish stone. Wild from Delaware south and west to Missouri and Texas. Represented in cultivation by numerous varieties, such as Newman, Arkansas and Pottawattamie.

Prunus angustifolia watsoni Waugh.—*P. watsoni* Sargent. The Sandhill plum. A western extension of the foregoing. Shrub 6-10 feet high; leaves ovate, acute, rounded or wedge-shaped at the base, finely crenulate-serrate, lustrous on the upper and pale on the lower surface; petioles slender, grooved, bi-glandular at the apex; flowers in crowded, few-flowered fascicles; calyx cup-shaped, the lobes acute, rounded at the apex, without glands, ciliate on the margins, pubescent

on the inner face; petals inserted remotely on the glandular disk, narrowly obovate, rounded and more or less erose above, contracted below into short claws, pure white; fruit globose or rarely oblong, red or yellow. Sandy streams and hills south and southeast Nebraska and central and western Kansas. Has a few cultivated varieties, but they are little known.

PRUNUS ALLEGHANIENSIS Porter.—American Sloe. A small, slender tree or shrub, 3-15 feet high; leaves lanceolate or oblong-ovate, often long-acuminate, finely and sharply serrate, softly pubescent when young; fruit dark purple, with a bloom. Alleghany mountains in Pennsylvania. Not known in cultivation.

PRUNUS UMBELLATA Ell.—Hog plum, or Southern Sloe. A small, bushy tree; flowers on slender pedicels nearly an inch long, rather large, white; leaves smallish, ovate or slightly obovate or sometimes short oblong, thin and dull, closely and evenly serrate; fruit about three-fourths inch in diameter, yellow or reddish; flesh firm and austere; stone short and turgid, cherry-like. Seashore from South Carolina to Florida, and westward to Mississippi, Louisiana and Arkansas. No cultivated varieties.

PRUNUS SUBCORDATA Benth.—Pacific plum. A small tree 20-25 feet high; leaves broadly ovate or orbicular, usually cordate, sharply and often doubly serrate, slightly coriaceous, dark green on the upper and pale on the lower surface; flowers in 2-4 flowered umbels on slender pedicels; calyx lobes oblong-obovate, rounded at the apex, half as long as the white petals; fruit oblong, dark red or purple or sometimes yellow. Pacific coast species. Occasionally cultivated.

PRUNUS MARITIMA Wang.—The Beach plum. A very variable species. Low straggling shrub, 1-5 feet high, leaves ovate or oval, finely serrate, softly pubescent underneath; pedicels short, pubescent; fruit globular, purple or crimson, with a bloom, one-half inch in diameter; stone very turgid, acute on one edge. Sea beaches, New Brunswick to Virginia. Some distance from the coast has leaves smoother and thinner, and fruit smaller. Perhaps this variation, mentioned in Gray's Manual, is to be identified with Small's *Prunus injucunda*, which is a form of the Beach plum growing in Georgia and Alabama. Graves' plum, *Prunus gravesii* Small, is a Connecticut form with small roundish, coarsely serrate leaves. It is rare and of no practical consequence. The Beach plum is sometimes cultivated, and gives promise of greater usefulness in the future. The variety Bassett is to be referred to this species.

PRUNUS GRACILIS Engelm. and Gray.—Oklahoma plum. A small shrub, 1-4 feet high; soft, pubescent; leaves oblong-

lanceolate to ovate, acute, sharply serrate, becoming nearly glabrous above, 1-2 inches long; pedicels and calyx pubescent; fruit less than one-half inch in diameter; stone rather turgid, sub-orbicular. Prairies and sandy places, southern Kansas to Texas and Tennessee.

DWARF FASCICLED CHERRIES

PRUNUS PUMILA Linn.—Eastern Sand cherry. A low, straggling shrub, usually decumbent at the base, the stronger branches erect, sometimes to a hight of 5-7 feet. Flowers small, on slender stalks; leaves long, oblanceolate, thick and veiny, sharply serrate; fruit mostly black, as large as a Morello cherry, edible. Occurs along rivers and coasts in the northern states. Not much cultivated except in botanical collections.

PRUNUS PUMILA BESSEYI Waugh.—*P. besseyi* Bailey. Western Sand cherry. A western modification of the preceding, usually more erect, with larger, thicker, slightly broader, more coarsely serrate leaves, the teeth being more appressed; fruit larger, on shorter, thicker peduncles. Grows wild from Manitoba to Kansas, westward to California and Utah, and eastward, perhaps, to New York(?). Introduced to cultivation as the Improved Dwarf Rocky mountain cherry.

PRUNUS CUNEATA Raf.—Appalachian cherry. An erect shrub, 1-4 feet high, often rather strict; leaves oval, oblong or obovate, obtuse or sometimes acute at the apex, narrowed or wedge-shaped at the base, more or less serrate, with fine appressed teeth, rather thin, about 1-3 inches long, occasionally as much as an inch wide; petioles 4-10 lines long; flowers in umbels; fruit globose, less than one-half an inch in diameter. Usually in wet soil or among rocks. New Hampshire to Minnesota and southward to North Carolina. Not known in cultivation.*

RACEMED CHERRIES

PRUNUS SEROTINA Ehrh. Wild Black cherry. Sometimes shrubby, but often becoming a good-sized tree, with fine close-grained wood, highly valued for cabinet work; leaves oblong or lance-oblong, usually taper-pointed, shining above, glabrous or gray tomentose beneath, serrate, with short,

*PRUNUS PENNSYLVANIA Linn.—Bird cherry, Pin cherry. Though belonging to a somewhat different section of the genus, this species should be mentioned here. It is a small tree, with light, reddish bark; oblong-lanceolate, pointed leaves, with margins finely and sharply serrate; flowers small in fascicles, on long pedicels; fruit the size of small peas, light red, sour, growing several in a cluster. Growing in rocky and sandy woods, especially after fires or lumbermen have been through. Atlantic coast to Rocky mountains, especially through Canada and the northern states.

incurved, callous teeth; flowers in long racemes; fruit black, bitter, as big as peas. Quebec to Kansas and southward. Shows many interesting variations. In New Mexico and Mexico it runs into the following.

PRUNUS SEROTINA SALICIFOLIA Waugh.—*P. salicifolia* H. B. K. *P. capuli* Car.—Willowleaf cherry, Mexican cherry. Has longer, narrower leaves than the former. Found along the Mexican border and in Mexico. *Prunus alabamensis* Mohr, seems to stand somewhere between this and the last.

PRUNUS VIRGINIANA Linn.—Choke cherry. Tall shrub or small tree, with oval, oblong or obovate leaves, abruptly pointed, thin, sharply serrate, with slender, projecting teeth; flowers in racemes, shorter and closer than in *Prunus serotina;* fruit ripening in summer, red, turning almost black, astringent when green, but fairly eatable when fully ripe. Ranges from Newfoundland to Manitoba and British Columbia, south to Georgia, Texas and Colorado. Occasionally cultivated.

PRUNUS VIRGINIANA DEMISSA Torr.—*P. demissa* Walp.—Western choke cherry. A western extension of the former, having thicker, stiffer, boader leaves, more inclined to be gray tomentose on the backs, more obtuse at the apex. Rocky mountains and westward.

PRUNUS CAROLINIANA Ait.—Carolina Laurel cherry. A small, ornamental evergreen tree, native to the south Atlantic states; leaves coriaceous, smooth, glossy, lance-ovate or oblong, entire, or with a few sharp appressed teeth; flowers in dense, upright racemes which are shorter than the leaves; fruit small, black and bitter.

III

The Domestica Plums

A WHOLE chapter might easily be filled with a review of the speculations which have been made concerning the origin and early wanderings of the Domestica plums. The present writer has elsewhere given an entire chapter to a bibliography and summary of the early history of the Reine Claude group alone.* It does not seem profitable, however, at the present time to devote more than a paragraph to matter of such doubtfully practical value.

The Domestica plums probably had a common origin; and perhaps they were evolved from the Damsons, as has been frequently supposed. Possibly, also, the Damsons were evolved from the European Sloe, as has also been guessed; but there is no evidence

*Gardeners' Chronicle, 24:465. 1898.

BLOSSOMS OF DOMESTICA PLUM, RICHLAND

except that of the external characters of the species to warrant such a supposition.

Doubtless eastern Europe and west-central Asia were the original home of the Domestica plums as we now know them. It seems fairly certain that such old and distinct groups as the Damsons, the Reine Claudes, and the prunes came from that country wearing much their present botanical aspects,—though, of course, all have been greatly improved horticulturally since their arrival in Europe. Koch* thinks that the Prunes were introduced to Hungary from Turkestan about 400 to 450 years ago. The Reine Claudes were introduced later, coming into Europe by way of Italy, France and Germany in this order.

These plums were introduced into this country from Europe at the establishment of the first colonies, and new strains and varieties have been brought over from time to time ever since. Perhaps the most important separate importation of these plums was that made by the French colonists in Canada, where some of the old French varieties are still propagated precisely as they were brought over.

The Damsons and the Myrobalans have been included in the same species with the Domesticas by some writers and have been kept separate by some. In this book they are put into separate groups.

After putting the Damsons and the Myrobalans out of consideration, however, there are several types left, showing somewhat important differences among themselves. We will notice these several types briefly, taking them up as nearly as possible in the order of their prominence.

The Reine Claude, or *Green Gage group*.—As has already been mentioned, these plums were recognized

*Die Deutschen Obstgeholze, 146. 1876. This is one of the best works on the subject.

as a separate type from very early times. They were brought to France from Italy about the year 1500, by Queen Claudia, wife of Francis I. The name, Reine Claude, was given in her honor. Not long afterward the Reine Claude plums were introduced to England. The introduction into England came from Italy, under the old Italian name, Verdoch, and from France with the labels lost. This latter importation from which the labels were lost came to the Gage family, prominent English amateur horticulturists of that day; and from this family received the name, Green Gage.

These varieties come more or less true from seed, and they have been largely propagated in that way. This has given rise to a large group of varieties,—many of them having originated in this country,—all having numerous characters in common with the typical Green Gage. These group characters are as follows: Foliage usually large, leaves broad and rather flat, with very coarse serrations; fruit, nearly spherical, in a few varieties slightly elongated, green or tardily turning to a dull, creamy yellow, occasionally with a faint pink blush; flesh, rather firm or even hard, green, clinging to the stone, (partially free in a few varieties).

The principal varieties of this type grown in this country are: Bavay, Green Gage, Lawrence, Imperial Gage, McLaughlin, Jefferson, Washington, General Hand, Lucombe Nonsuch, Bleeker, Peters Gage, Ouillin, Bryanston and Golden Gage.

It is one of the most persistent types to be found among the plums. It is also one of the best.

The Dame Aubert type.—This includes our largest plums, perhaps excepting one or two hybrids. It appears to be of more modern origin than some of the other types of Domestica plums, yet it has been known in Europe for about two centuries at least. The old European variety, which is best known and oftenest

mentioned, is called Dame Aubert in nearly all the European literature. This is undoubtedly the same variety which we know as Yellow Egg, or Magnum Bonum. The only other varieties of this type which I know are Golden Drop and Grand Duke.

The group characters of these varieties may be summarized as follows: Large growing trees, with large foliage; fruit, very large oval, with more or less of a neck; yellow or greenish yellow, or purplish;flesh yellow.

The Prunes.—Horticulturists are now and always have been much at variance as to what should be called a prune. In this country, particularly in the Pacific states, a prune is any plum that can be dried and sold as a prune. From the standpoint of classification, such a definition cannot be accepted. Such an application of the term has never been made in France or Germany, where these plums are largely grown. The confusion which arises from the loose use of the term prune is painfully evident, especially to Pacific coast horticulturists; and it seems much better when we speak of prunes to use that word to designate a pomological group rather than a commercial accident. From the standpoint of classification, the only proper way to do is to select some type which has certain visible and recognizable characteristics, and to call those varieties prunes which bear a sufficient resemblance to the selected type. The variety which would be best understood and most readily accepted as a type by American pomologists is doubtless Fellenberg, sometimes called Italian Prune. Other varieties which might be commony accepted as prunes are German Prune, and Prune d'Agen.

The group characters which may be assigned to the prunes, considering them as a distinct type, are as follows: Trees and foliage, various; fruit, mostly

medium to large, always oval or ellipsoid, usually with one side of the oval straighter than the other; compressed; color, blue or purple; flesh, mostly greenish-yellow, rather firm; stone, usually free in a large cavity.

It will be seen that the group, as thus characterized, corresponds fairly well to the popular western conception of what is a prune. The prune type is one of the most striking and perhaps, commercially, the most important, of any of our cultivated plums.

. *The Perdrigons.*—The so-called Perdrigons have always been recognized by European writers as a group of considerable importance. Downing describes White Perdrigon, Blue Perdrigon and Red Perdrigon, and some other varieties which a study of the bibliography would refer to this group. Still, the name Perdrigon is now practically unknown in America, and the type itself is hardly more common. The only one of the old original European varieties which I have found in this country is Royal Tours, and this is very rare. The best known variety is probably Goliath. The Late Black Orleans, cultivated by Ellwanger & Barry, I would also refer to this type. I have recently met the old French Red Perdrigon in Canada.

The group may be roughly characterized as follows: Fruit, medium to large, spherical or oblate, sometimes distinctly depressed at the apex, usually with a deep suture, blue or purple; flesh, greenish-yellow, rather firm.

The Diamond type.—The uninformed public knows three varieties of plums,—"blue plums, red plums and yellow plums." It is often amusing to hear the confident tone in which the benighted cow farmer or hog grower decides to plant one tree of "blue plums" and one tree of "yellow plums" to supply his family. "The blue plum is the best kind to eat," he says, "but the yellow variety is best to can."

BRADSHAW PLUM TREE

A. H. Johnson's Orchard, Wolfville, Nova Scotia

There is, however, one type among the Domesticas which almost fulfills the popular notion of a "blue plum." This is the Diamond type, represented also by such varieties as Kingston, Quackenboss, Blue Imperatrice, Shipper, St. Lawrence and Arctic. These varieties are characterized by having fruit mostly large, oval, very slightly compressed sidewise, dark blue, with heavy blue bloom, flesh generally yellow, very firm, usually clinging to the stone.

These plums are mostly good shippers and good bearers, and, though not of high quality, they are usually successful in the open, undiscriminating market. They are to the plums what Ben Davis and Gano are to the apples.

The Bradshaw type.—After we leave the Diamond type we are drawing pretty fine distinctions, yet it seems possible to group together roughly some of the varieties commonly known as "red plums." The Bradshaw serves best as a type of these varieties, which are all characterized by having large, slightly obovate fruit, which is purplish, and has distinct pinkish dots. The varieties also have a thin skin and a comparatively soft, juicy flesh. They are popular for home use and for market.

Along with Bradshaw there should be referred to this type such varieties as Victoria, Pond, Field, Duane Purple, Oswego and Giant Prune.

The Lombard type.—Probably the thinnest distinction of all is to be made betwixt the Bradshaw and the Lombard type. The latter, however, differs from the former in having fruit generally smaller, more regularly oval, very slightly compressed sidewise, pinkish-purple, or purplish. The varieties which I would refer to this type, rather than to the preceding, are Lombard, Communia, Voronesh 20 of Budd, Leipsic of Budd, Prince of Wales, Merunka.

It will be noticed that more than half of these are Russian varieties; also that all the Russian varieties are referred to this type. It seems to inherit a hardy, thrifty, north-European strain of the Domestica blood, somewhat less encumbered with the amenities of high culture than the German, French and Italian types. It is, in fact, in these Russian varieties that the writer finds his justification for the attempt to separate Lombard from Bradshaw in a scheme like the foregoing.

The Domesticas doubtless exhibit at present the highest degree of amelioration known among plums. Perhaps it would not be too much to say that they show a greater improvement upon the original wild forms than any other fruit in the whole horticultural catalogue. There is reason enough for this in the fact that they have been subjected to all the improving influences of cultivation for at least four hundred years,—probably longer,—whereas the American species have been impressed into our gardens practically within the last quarter century; and the Japanese plums have not been carefully propagated and selected until they reached this country within the memory of the youngest fruit growers. Doubtless the American and Japanese species have greater undeveloped possibilities, and in certain positive good qualities they are already superior to the Domesticas. The future no man can predict; but for the present, this comparison of the evolution progress of the several classes of plums is certainly fair.

The Domesticas are specially adapted to a somewhat restricted range of soil and climate on this continent. They prove entirely satisfactory in Nova Scotia, central New England, New York, southern Ontario and Michigan, and the Pacific coast states. Even in these districts they come into sharp competition with some of the Japanese and native sorts.

There are still many persons who do not know of any other plums than the Domesticas,—the "blue plums, yellow plums and red plums,"—and a strong prejudice of conservatism attaches other better-informed people to the favorite of their fathers and grandfathers. Adding these considerations to the many really good qualities possessed by the Domesticas, we may readily see the prematurity of the various predictions which we have heard of how they should be promptly superseded by the newer plums.

IV

The Damsons

THE Damson plums have always been classed with the Domesticas in this country. They are, however, almost as distinct from the Domesticas as the Myrobalan plums are, and the two groups are much more easily separated than are the Wildgoose and the Chicasaw groups, for instance. They are sufficiently distinct to have been given specific rank by many botanists, particularly on the continent of Europe, where they are better known. The great botanist Linnaeus made this group a botanical variety of *Prunus domestica*,—a disposition which seems to the writer to be still the best one.

From the horticultural standpoint they are to be looked upon as a group apart from the Domesticas, though closely related to them, just as the Nigra

THE BULLACE

Sometimes called PRUNUS INSITITIA, but evidently a Damson

group is a group by itself, though closely related to the Americanas. The two cases are parallel.

The Damsons have a long history. They have been known and recorded ever since botany had a record. The presumption is in favor of the common theory that they are the progenitors of the whole race of Domesticas. This presumption gains color from two facts; first, that Damsons are to-day found grow-

ing wild in quantities in western Europe, (see Koch, Die Deutschen Obstgehölze, p. 145); and second, that their characters differ from those of the Domestica plums as those of any wildling plant usually differ from those of its cultivated and domesticated descendants.

Speculation has sometimes run still further, and has surmised that the Damsons were derived from the Sloe, *Prunus spinosa*, so that the genesis of the modern Domesticas would stand:

Prunus spinosa—P. damascena—P. domestica.

This pedigree, however is only a surmise.

The Bullace, spoken of by many writers as a separate thing with a botanical specific name of its own,—*Prunus insititia*,—is evidently to be put into the Damson group. (See Waugh, Botanical Gazette, 27:478.)

The Damsons are hardy, thrifty and easy of cultivation. What is more, they bear regularly and abundantly, and there is usually a good demand for the fruit, so that they have been found among the most profitable plums to grow by many cultivators. They have considerable culinary value, especially with those persons who have not become acquainted with certain varieties among the natives. To the writer it seems that Wayland, Moreman and Golden Beauty might supplant the Damsons almost altogether, to the mutual satisfaction of the cook and the plum grower. This may be merely a matter of personal taste, however, or it may be nothing better than prejudice.

The Damsons come fairly true from seed; and they have often been propagated in that way. This accounts for some of the perplexing variations which they present, and for the confusion of varieties. It is only within recent years that a few of the better varieties have been selected and perpetuated by grafting.

EUROPEAN SLOE. PRUNUS SPINOSA

Possible progenitor of the Damsons and Domesticas

In the various editions of Downing's book, the Damsons are all treated together in one paragraph. At the present time, however, the only way to give a fair understanding of the subject is to put the Damsons by themselves into a group co-ordinate with the other generally recognized horticultural groups, and to describe the named varieties and discuss them just as all other named varieties are discussed.

V

The Myrobalan Plums

HE Myrobalan species has produced a few horticultural varieties in this country, of which Marianna has claimed most attention. One secures a wrong impression of the group, however, by studying first the Marianna. Marianna is not typical, it is exceptional, and the group should not be treated with special reference to this variety. It is especially misleading to call this the Marianna group, as some writers have done, myself among them.

The Myrobalan plum is probably an offshoot of the Domestica tribe originally. It is characterized by a more slender growth and a greater ease of propagation, by thinner leaves and by softer, thinner-skinned fruit. It has been used very extensively in this country, as in Europe, as a stock for propagating other

plums; and most of the cultivated varieties are chance survivals from plants primarily set for stocks.

The Myrobalan plum was described as a particular variety in Prince's Pomological Manual (1831) and in the first edition of Downing (1845); and the name is similarly treated by nearly all the older European authors. This name, however, does not properly apply to any particular variety, but is a group name like Damson or Chicasaw. The best types of the species which I know among the cultivated varieties are Brill and Frostproof. Next to these I would name a sort found in some collections as Hogg's No. 2 (a name which I do not think it worth while to revise). Yet my friend, J. W. Kerr, thinks this is the same as Marianna. Decaradeuc is generally understood to be pure Myrobalan, and it is probably not very far from the type. But Marianna seems to be impregnated with a strain of native blood, and impresses one as Myrobalan blended with Chicasaw.

Professor Bailey has elaborately traced the history of the Myrobalan group and of the Marianna as related to it.* The close relationship of the Marianna to the Myrobalan group is indicated by the ease with which it grows from cuttings, in which particular it strangely excels the Myrobalan itself.

Marianna was extensively advertised a few years ago and widely planted. This was certainly a misfortune for everybody, unless the nurseryman made some money out of it. Marianna, besides being self-sterile, is a poor fruit for orchard purposes. It is not good in quality, nor large in size, and is so soft and watery as to be of little value when secured. Occasional well-grown specimens are passable, but the

*Cornell Experiment Station Bulletin 38:32. 1892. Also "Evolution of Our Native Fruits." 208. 1898.

variety is not one to be recommended anywhere, except for stocks. The other varieties of the same group, as far as I have examined them, are no better. Hattie, which is also somewhat anomalous, does not constitute an exception to this depreciation. With all the early advantages which the Myrobalan plum has had it would seem as though it might have done better; and I do not look for any considerable additions to our variety catalogue from this quarter.

The Pissard plum is generally understood to belong to the Myrobalan group, though it is often rated as a separate botanical variety (*Prunus cerasifera pissardi*). It is notable chiefly for its decorative foliage, for which quality it receives mention in Chapter XXV.

The Myrobalan, however, seems to be of some promise for blending with other species in hybridization. Mr. Burbank has sent me specimens of several fairly acceptable varieties which numbered the Myrobalan among their miscellaneous parents. There are some valuable qualities which are characteristic of the species, and if they can be saved while the bad qualities are discarded in hybridization, we may still live to see the day when we shall be glad, as fruit growers and fruit eaters, that we have had the Myrobalan plum.

VI

The Simon Plum

THE Simon or apricot plum, *Prunus simoni*, came to this country from France about fifteen or twenty years ago, but it did not attract much attention from horticulturists till about ten years ago. It is probably native to China, though it has not been found wild. It was sent to the Museum de Paris by Eugene Simon, after whom it is named, and who was at that time a representative of the French government in China. It was first described by Carriere, a French botanist and horticulturist, in a French horticultural magazine, in 1872. The first mention of it in this country seems to date from 1881, though there is some doubt about the authenticity of the observation. The first impor-

THE SIMON PLUM

As Sold in the City Market

tant account of it in this country was given by Bailey in 1893.*

The Simon plum seems to be intermediate between the apricot and the plums. It is most closely related to the Japanese plums, which it resembles in several respects and with which it hybridizes freely. It is properly to be regarded as a species, though it has sometimes been supposed to be a hybrid. Its characters and habits are not those of a hybrid, and there is nothing else to indicate a mongrel origin for it. It is less variable than hybrids usually are. There is only one variety of it known in this country, and this is commonly called, not by a horticultural name, but by the botanical name of the species.

It has been planted for market in considerable quantities by a few persons. Certain growers report it profitable, even in New York, though it does best in California. It is frequently seen in the markets of our eastern cities, coming in early in the season among the first of the plums. It looks well, but the quality is not good, and it does not sell rapidly. It ships well, keeps well and looks well on the fruit stands; and as these three qualities are of prime importance in a market fruit, it will be seen that the Simon plum is a thing to be reckoned with.

Probably the greatest value of the Simon plum lies in the readiness with which it blends with other types in hybridization and in the good results which it gives in such cases. "It is the best of all plums for hybridizing," says Mr. Burbank; and his results up to the present time amply illustrate this statement. The poor qualities of the fruit seem to disappear in hybridizing, and the good qualities seem to be retained. The same thing cannot be said of the tree, however,

*Cornell Experiment Station Bulletin, 51:34, 1893.

for the poor qualities of the Simon tree remain as defects in some of the hybrids. Yet, when all has been summed up, it is clear that this is a very important type, taken with our other cultivated plums, and it seems certain that it is to play an important part in the future evolution of American plum pomology.

VII

The Japanese Plums

IT has been almost exactly thirty years since the Japanese plums were introduced into America. It has been only sixteen years, however, since they began to be distributed among fruit growers, and it was only six years ago that the horticultural public began to get a clear idea of them. In this short time they have received more attention and have been more widely disseminated than any agricultural species ever introduced to this continent.

The first trees, according to Bailey, were imported from Japan in 1870, by Mr. Hough, of Vacaville, California, at a cost of ten dollars each. These trees soon passed into the hands of the late John Kelsey of Berkeley, California, and were fruited by him about 1876. The commercial propagation of these plums

was begun in 1883, by W. P. Hammon & Co., of Oakland, California, and the variety was named after Mr. Kelsey. After this several other importations were made, especially by Luther Burbank of Santa Rosa, California. Very soon seedlings began to appear, grown in America, and the catalogue of Japanese plums has since been swelling at an alarming rate.

The Japanese plum is thought to be a native of China, though it has never been found growing wild. It was first described botanically by Roxburgh, who found it in the botanic gardens at Calcutta. According to Georgeson it is considerably grown in a haphazard sort of way, without much care or cultivation, in Japan. It has not been carefully propagated there by buds, and little pains has been spent on the nomenclature of the varieties by the Japanese. This accounts for some of the confusion which we have to labor with in this country.

The Japanese plums, though so remarkably popular in America, seem to be still practically unknown in Europe. They have suffered from too great a popularity in this country. They have been planted out of all proportion to their relative merits. Untested varieties have been introduced, boomed and sold to planters, where they could be of little or no use. Extravagant and fantastic claims have been made for them. They have been said to be curculio proof (as what plum has not?); they have been called proof against black knot; they have been recently heralded by a popular horticultural writer as "undoubtedly the best in quality of any plums grown." All these statements are misleading, disappointing, false. Lots of folks have forgotten the little prophecy of Professor Bailey in his first bulletin on the Japanese plums. He said, "We can depend upon it that they will develop weak points somewhere." They have, as a matter of

BURBANK, THREE-YEAR-OLD TREE

Garden of A. C. Smith, Massachusetts

history, been found as apt to yield disappointment and failure as any other fruit. Still, it is abundantly true, to quote again from Bailey, that "the Japanese plums constitute the most important type of fruit introduced into North America during the last quarter of a century."

The Japanese plums are strong growers. In fact, this becomes almost a vice at times. Some of them, particularly Burbank, require the severest heading-in to keep them within reasonable bounds. The rapid-growing wood is also somewhat brash, like peach wood, and apt to break or split at the crotches. The foliage is rich, abundant and comparatively free from disease. The blossoms appear early,—the first in the plum-flowering season. They come so early as to run considerable danger of frost, and this is one of the defects of the species. The blossoms are abundant, large, white, strikingly ornamental and usually very strong sexually. The fruit varies greatly in size, color, quality and season. In general the fruits are firm, excellent shippers and keepers, when not attacked by monilia, to which they are subject. They are mostly tenacious clingstones. The quality runs fair to good and occasionally very good, though in general they are inferior to the Domesticas, and, in the opinion of the writer, to the best of the natives. They are rapidly finding their way into American fruit markets.

The varieties altogether seem to be a little less hardy against cold than the common Domesticas, or about as hardy as the Wildgoose type. Still, the most popular varieties thrive in Maine, Vermont, Ontario and southern Iowa.

The Japanese plums are still much misunderstood. Some persons still claim everything for them, while others curse them by every form of available profanity. They have not been with us long enough

MR. J. W. KERR'S OPINION OF THE JAPANESE PLUMS

End of one of the first orchards of Japanese Plums in the Eastern States; Burbanks in this case

to have become adjusted to their proper place. For the present a good deal of conservatism should be cultivated in speaking to their praise or blame. It is safer and wiser to wait and see what is going to come of them.

VIII

The Americana Group

THIS is certainly the dominant group of American plums. Were it not for the danger of getting into an argument with certain worthy persons who have expressed a different view, I think I should have said also that this is the most important group.

However that may be, it is botanically and horticulturally the most prominent type of native plums. It spreads over a far wider geographical range than any other species or hybrid family, and it occupies its ground within its range with more persistency. The type is more stable,—harder to break. This is why other native species are just now more prominent in hybridization work; but it is no reason why they should be more useful in the end. There are more

named varieties of the Americanas now propagated and cultivated than of any other group of plums, not excepting the popular Japanese plums or the old-established Domesticas. There are no statistics at hand, but I feel sure that there are more acres planted to Americanas than to varieties of any other class excepting the Domesticas, and possibly the Japanese. These statements are not intended to be a recommendation of the Americana plums, but mere expressions of fact.

In its native forms the species *Prunus americana* ranges from Ohio to Texas, and northward to Minnesota and Montana. Along the northern border of this range and eastward in New York state it shades away insensibly into *Prunus americana nigra* (the Nigra group). Horticulturally the Americana plums range from Prince Edward Island, Manitoba and Vancouver to Florida, Louisiana and Texas. In the southern part of this range, however, they are not very successful. They can hardly be recommended as profitable for orchard planting south of the 37th or 38th parallel. Over a large area, however, especially in northern Iowa, Wisconsin, northern Michigan, Minnesota, the Dakotas, Montana and that part of Canada between Ontario and Vancouver, they are practically the only plums that can be grown. In extremely exposed situations they are almost the only fruit of any kind that will thrive. The northern limit of their cultivation has not yet been reached. They, with the Nigras, will probably be able to go as far north as the land can ever be cultivated. Professor C. C. Georgeson of Sitka, Alaska, writes me that he has seen no plums growing in that country, but I have not the slightest doubt but that the Americanas and Nigras will succeed perfectly there.

The indigenous Americanas grow usually along

creek or river banks, in deep, rich, comparatively moist soil, sometimes under the partial shade of taller timber, but sometimes also in the open sun. The reasons why the plum is thus confined to the creek banks are the same that account for all other trees having a similar distribution in the prairie states. It is principally because recurring prairie fires and grazing herds of buffalo formerly killed out all the young timber as fast as it started on the uplands. Nevertheless, the Americana plums really prefer deep, rich, comparatively moist soil,—just such situations as they found in their native state. Still, they flourish on almost any soil and with almost any exposure, and withstand drouth on windy uplands as well as any tree.

The pomological characteristics of this group are as follows:

Tree usually rather low-headed, spreading, with a thick, thorny, bushy top; rather slow-growing, though young trees and water sprouts often make a phenomenal growth; branches stiff and strongly set, rather crooked, dark colored. The tops are very difficult to manage on young trees, and it is always a serious problem to form a good head, especially where trees are exposed to strong winds. (See further under pruning, Page 276); leaf large, oval, thick and rough, occasionally pubescent (var. *mollis*), but usually without covering, with large jagged double teeth on the margins (this character is very distinct) and usually without glands on the petiole; flowers medium to large size, white; the calyx without glands on the margin; fruit of various forms, but usually more or less oval, very often slightly compressed, rather frequently slightly oblique-truncate at the ends; cavity usually shallow or very shallow; suture seldom more than a line; color mostly dull reds over yellows, the yellow sometimes showing more than the red; dots nearly always very

minute, hardly visible, never large and conspicuous; bloom almost always thick and bluish, skin thick, tough and usually astringent; flesh always yellow; stone medium to large, round or oval, more or less flattened, mostly cling; quality good to extra good, aside from the astringency of the skin.

Several of these points demand further discussion.

The flowers appear comparatively late in the season. They are not very strong sexually. Various anomalous forms frequently occur. Extensive examinations, made by the writer, of blossoms from all parts of America showed an average of 21.2 per cent with defective pistils. This defectiveness ranged from nothing in some varieties to 100 per cent. in others. Defective anthers are sometimes found, though more seldom. One tree at least is known on which the flowers have no petals. The flowers are sometimes proterandrous, and rather frequently proterogynous.* Sometimes the styles are longer than the stamens, and sometimes the stamens are longer than the styles. These variations are so striking that Heideman based an elaborate classification upon them and proposed to explain the affinities of the varieties in pollination by this method. (See under pollination, Page 282.) These variations, however interesting, do not seem to have any practical significance.

The fruit of the leading varieties is of fair size. In fact, it is large enough for the general market. Some of the better kinds well grown are large enough for a fancy trade; and their handsome appearance makes them still more acceptable. Two qualities detract, however, from their value as fruits for the fancy market and for dessert purposes. These are the thick, astringent skins, and the clinging stones.

*Blossoms in which the pollen matures before the pistil is ready to receive it are called *proterandrous;* those in which the pistil becomes receptive before the pollen is mature are called *proterogynous.*

Regarding the first point, it should be said that the astringency of the skin has often been magnified by persons unaccustomed to these plums and who have eaten them too green. In many varieties, when thoroughly ripe, the skin is neither thick nor unpleasantly astringent. The faintest suggestion of this characteristic plum taste is altogether pleasant and adds a richness of flavor to the fruit which the best horticultural epicure might well patronize. Professor Goff says, "When divested of the skin, the flesh of the finer sorts is scarcely surpassed in richness by that of any of the stone fruits. In some varieties, as the Mankato and Gaylord, the skin separates very readily from the ripe fruit. The skin of the Cheney and Ocheeda practically dissolves in cooking, and that of the Aitken and a few other sorts is so thin and delicate when the fruit is ripe that the skin is no more objectionable than that of the finest European or Japan sorts." I have said elsewhere that, in my opinion, the finest quality known among plums,—that is to say, in the whole kingdom of fruits,—is to be found in some of the fine Americanas, when they are "just right." Other plums are more meaty, some are sweeter, many are better for eating out of hand, but the fine "bouquet" of flavors presented by the Americanas cannot be surpassed.

Most of the varieties are clingstones, and the few freestones seem to me not to be the varieties of highest flavor. There are, however, several respectable varieties in which the stones are as free as could be desired.

Are the Americanas salable? They are. The large, highly-colored Domesticas and Japanese varieties are preferred at the fruit stands, and doubtless will long continue to be. There are, too, many cooks who prefer the old-fashioned plums like Lombards and Damsons, largely because they are used to them.

MR. O. MY LORD of Minnesota

Interested in the introduction of the Americanas. The trees at the back are De Sotos

There are buyers, too, who select plums solely on their size, and the Americanas are not the biggest plums known. There are instances on every hand, however, to prove that the Americanas find a profitable market. Many cases have come to my knowledge in which they were bought in preference to Domesticas or Japanese plums, and sometimes at a higher price. It is merely a matter of growing good fruit and educating the buyers to it.

The Americana plums are very fruitful. In fact, overproduction is frequently a grievous sin with them. They often require extensive thinning. If this is not given, the fruit is small and unattractive. And it not infrequently happens that trees left unthinned kill themselves with overbearing. Cases of unfruitfulness are very rare, and are usually explained by lack of pollination or other local conditions.

Many of the remarks made here concerning the Americanas, especially as regards their culinary value, their salability and their productiveness, apply also to the other principal groups of native plums.

The Americana group is burdened with varieties. There are literally hundreds of them named and more or less disseminated. Three-fourths of these could be eliminated without loss. In fact, it would be a positive gain to pomology, as not more than one-fourth of the varieties are really meritorious. Of the remaining one-fourth, another fifty per cent. or more could readily be dispensed with on the ground of close resemblance to other varieties. Indeed, it is easy to find two to a dozen varieties so closely alike that the best expert can hardly detect any difference. It must come to pass very soon that many of the old varieties will be discarded and the names forgotten. It happened so with the Domesticas and it will surely be the case presently with the Americanas.

IX

The Nigra Group

THE Nigra group is not of great importance. Though it is sufficiently distinct to be called a separate species by several eminent American botanists, and though it has yielded three or four first-rate horticultural varieties, it has not the striking characters nor the economic value to fix it very prominently in our attention.

The wild plum of Canada and New England was first noticed botanically by Aiton, who described it as a species with the name *Prunus nigra* in 1789. It was lost sight of in this country for several years through being consolidated with *Prunus americana*. More recently this group has been thought to be distinguishable from *P. americana*, and Aiton's name has

TYPICAL WILD TREE OF THE NIGRA TYPE

Burlington, Vt.

been revived by such botanists as Sargent, Britton and Sudworth.

The present writer, as elsewhere explained, has taken a compromise view. The Nigra group seems to me to be fairly distinct and manageable pomologically, to be different enough from *Prunus americana* to deserve separate botanical mention, but still to be so closely related to the latter species as to be best understood when called a variety of it.

Whatever the standing of the group botanically, it will be convenient to keep it as a separate pomological group, in spite of the fact that many of the varieties are very difficult to assign with certainty either to the Nigra or the Americana group. This was first discussed as a separate group by the writer in 1897.* The characters which may be relied on to distinguish varieties of this section in most cases are: Dark-colored bark; glandular serrate calyx lobes; broad leaves with glandular petioles; flowers larger than in the Americana group, often pinkish, and especially showing pink when half opened, the calyx lobes being also pink; fruit usually darker colored than in the Americana group.

In their habits and in most of their pomological characteristics, these varieties are much like those of the Americana group. They are exceedingly hardy, being probably the hardiest fruit plant known on this continent. Still, the Americanas are hardy enough for any section where any sort of farming can be carried on.

*Vermont Experiment Station Report, 10:102. 1897.

X

The Miner Group

THIS group is one of secondary importance, occupying a somewhat uncertain position between the Wildgoose group and the Americanas. From the circumstance that Professor Bailey first described it as *Prunus hortulana mineri*, making it an appendage of the Wildgoose group, it has been commonly looked upon as most closely related to the latter. The varieties in general, however, stand much nearer to the Americanas,—so near in fact that Professor Sargent refers them to *Prunus americana* and entirely ignores *P. hortulana mineri*.

It is probable, however, that the varieties of this group, like those of the Wayland and Wildgoose groups, are of mongrel origin. They may be hybrids of the Wildgoose type with the Americanas, which

would give them,—*theoretically*,—a parentage three-quarters Americana and one-quarter Chicasaw. Or they may be primary hybrids in which the Americana parentage has preponderated. The latter supposition is perhaps the more probable; though one supposition

BLOSSOMS OF MINER

might be true for one case and the other for a different case.

The foliage of the plums of the Miner group is much like that of the Americanas, but usually smaller and not so rough, with less conspicuous dentation of the margins. The fruit is usually rounder, the skin less dull colored, thinner and not so tough; the dots larger and more obvious; the stone thicker.

The varieties seem to be about as hardy as the Americanas. Several of them are of commercial value, especially Forest Rose, Prairie Flower and Miner.

XI

The Wayland Group

AT the beginning of critical plum study in this country, that is to say, in the publication of Professor Bailey's bulletin 38, in 1892, these plums were included indiscriminately with the Wildgoose plums in the so-called species *Prunus hortulana*. Mr. T. V. Munson seems to have been the first to call attention to their separateness. In his trade catalogue of 1896, I think it was, he advertised the varieties Wayland and Golden Beauty, referring them to Scheele's *Prunus rivularis*. Mr. Munson's view, that these plums belonged to a group somewhat apart from Wildgoose, Downing, etc., accorded entirely with the opinion just then forming in my own mind. In the summer of 1897 I gave the whole series diligent study in the field, becoming fully confirmed in this view.

The question now arose what to call the group. Mr. Munson had referred the varieties to *Prunus rivularis*. Was he correct in this? And was *P. rivularis* an acceptable name from the botanical standpoint? These questions were examined in detail, and my conclusions published at that time (1897).* Since then I have given the group much more extensive study, have monographed the horticultural varieties † (aside from re-monographing them for the present work), and have examined practically all the herbarium specimens in America which could throw light on the question, including duplicate types of Scheele's *Prunus rivularis*. Concerning the relationship of the Wayland group to Scheele's species name, the case, as it now stands in my mind, is as follows.

Scheele described his *Prunus rivularis* in 1848‡ from specimens collected in Texas by Lindheimer in 1846. The name was first used in this country by Coulter in 1891 in his Botany of Western Texas.§ It was here, I take it, that Munson noted the name and description. The distribution assigned to *P. rivularis* by Coulter was as follows: "Not uncommon on the Colorado and its tributaries and extending to the upper Guadalupe and the Leona."

It seems a trifle odd, even at first sight, that an important species could exist in a comparatively accessible country like western Texas, and there be yet so few specimens of it in our large herbaria. In the second place, if we refer Wayland and Golden Beauty to this species name, we must add Kanawha, Leptune, Reed, and several others. These plums, however,

*Garden and Forest, 10:350. 1897.
†Vermont Experiment Station Report, 11:281. 1898.
‡Linnæa 21:594. 1848.
§United States Nat. Herb. Cont. 2:102. 1891.

have originated in various localities. So far as known their origin is as follows:

American Golden	Missouri.
Crimson Beauty	Texas.
Cumberland	Tennessee.
Garfield	Ohio.
Golden Beauty	Western Texas.
Kanawha	Kentucky.
Nimon	Northern Texas.
Reed	Illinois.
Sucker State	Illinois(?)
Wayland	Kentucky.

It will be seen that these points cover a much wider range than that assigned to *Prunus rivularis*. It can hardly be supposed that a distinct species of such importance as to furnish these well-known varieties could be growing in the woods of Missouri, Illinois, Kentucky and Tennessee without being known to botanists. What, then, is the genealogy of the horticultural varieties in question? Let us recall the discussions of a previous chapter.

It will be seen by referring to Chapter XV that there is good reason for believing that natural hybridization has played an important part in the history of the wild plums on this continent. The entire group once described as a species with the name *Prunus hortulana* may reasonably be called a congeries of natural hybrids. The varieties of the Wayland group were at first included in the so-called species *P. hortulana*. May they not, in fact, have originated in the same way?

It seems almost necessary to take the affirmative view. If we accept the hypothesis of a hybrid origin for the Wildgoose group, we must also conclude that the Wayland group has a similar origin. The same arguments apply to both. These arguments briefly reviewed and adapted to this group are: (1) The Way-

land plums are in many respects intermediate between the Chicasaws and the Americanas (especially *Prunus americana mollis*). (2) They have originated in the territory where these two supposable parents occur, and especially in the region where the variety *mollis* is occasionally found. (3) They do not have any continuous geographical distribution of their own.

Let us now return to the consideration of *Prunus rivularis*. Scheele undoubtedly had one of these plums of the Wayland group when he described his supposed species. The duplicate types which I have examined would be referred to the Wayland group by any expert pomologist or botanist, I think. If we were to call the Wayland group a species, Scheele's name should be given to it. *Prunus rivularis* would supersede *P. hortulana* by right of several years' priority, for this section of the Hortulanas at least. But if we call the Wayland group a company of hybrids, we need not use any species name. It is better, indeed, to give them some convenient pomological name,—to call them, for instance, the Wayland group.

This matter of naming the group was carefully considered before I first published the name here used.* These varieties are sometimes called the Peach-leaved plums; but the same designation is carelessly and perhaps more often applied to all the Hortulanas. In the south they sometimes speak of the Golden Beauty type. But Golden Beauty is practically unknown northward. The variety best known in northern states is Moreman; but besides being practically unknown in the south, this variety is not strictly typical of the group. No other variety of the entire lot shows more clearly the distinctive characters of the group, and none is more widely known than Wayland.

---

*Vermont Experiment Station Report, 10:103. 1897.

For these reasons it has seemed best to use this name to designate the entire group.

The general characters of the Wayland group, especially those of pomological importance, may be pointed out as follows:

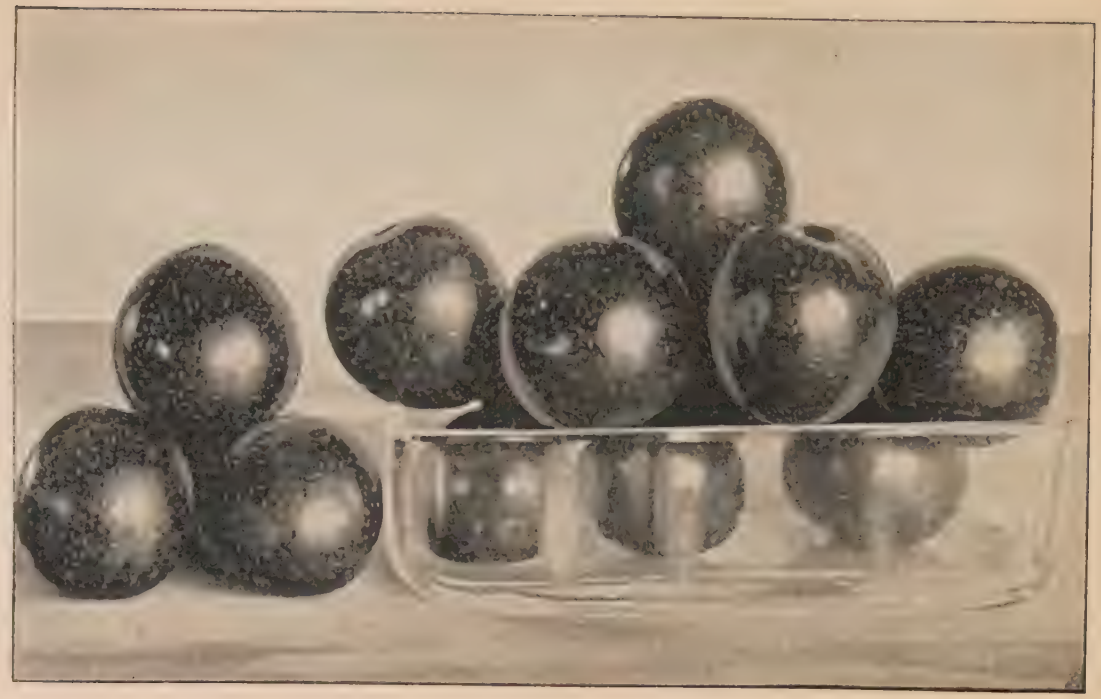
Trees fairly strong growers, with long, smooth, bending, willowy branches, the bark usually dark colored*; leaves large to very large, oval or sometimes slightly obovate, with taper points, glabrous above and finely tomentose beneath, especially on the larger veins, margins rather finely appressed-serrate, petioles with two to six glands; flowers appearing comparatively late, in long, dense clusters of characteristic form. The buds are especially characteristic; clear white; fruit usually strikingly spherical, or only a trifle ovoid or ellipsoid, medium size, either bright transparent cherry red or else whitish transparent yellow, quite different from the opaque yellow of Kelsey or Coe Golden Drop, dots usually large, whitish and conspicuous, bloom white, stone medium size, rather turgid, cling. The quality averages high. The flesh is almost always very firm and meaty.

Considering its origin, this group is comparatively distinct and homogeneous. For instance, the varieties are much more alike than those of the Wildgoose group, and much more distinct from other varieties of other groups than are the Miner-like varieties. To be sure, the group is not free from puzzling or equivocal forms. There are some varieties which it is hard to locate. Bailey put Leptune into the Miner group; and Berckmans, who introduced Kanawha, said, "This is beyond question a form of *Prunus americana*." Still, confusion has been much less frequent in this group than in almost any other class of native plums.

These varieties are particularly adapted to certain climates, especially in the middle and southern states.

---

*Certain varieties are described by nurserymen in the extreme southern states as having light colored bark. This may be due to the well-known fact that all species of trees have much lighter colored bark at the south than at the north.



FRUIT OF WAYLAND, TYPE OF WAYLAND GROUP

They are not desirable dessert fruits, nor are they good for eating out of hand. They are especially fine for preserving or spicing, after the manner traditionally employed with Damsons. For making jelly nothing within the knowledge of the writer excels the red-fruited varieties like Wayland and Kanawha. Nearly all the varieties are so distinctly superior for preserving, spicing and jelly making, that they might always command a patronage for these purposes alone. The great firmness of flesh which is characteristic of most of these plums makes it possible to ship them long distances in large packages to market, which is another item of importance to many fruit growers. The extreme lateness of ripening of many of the varieties makes them valuable for certain conditions, though it throws them out of consideration for points north of Milwaukee, Wisconsin, or Burlington, Vermont. The varieties are generally more hardy than the Wildgoose or Chicasaw plums. Some of them will succeed as far north as Burlington, Vermont, and even Golden Beauty, considered a distinctively southern variety, often fruits in Iowa and is fairly hardy in Vermont.

XII

The Wildgoose Group

OUR knowledge of the Wildgoose group dates from 1892. In that year Professor Bailey described *Prunus hortulana** as a species and included in it these plums and those now put into the Wayland group. Later in the year he published a full horticultural account of these plums† which for the first time brought them prominently to the attention of the pomological world.

The description of the group given at that time was as follows: "This, perhaps the most important group of native plums, includes varieties character-

*L. H. Bailey. Garden and Forest, 5:90. 1892.

†L. H. Bailey. The Cultivated Native Plums and Cherries, Cornell Experiment Station Bulletin 38:16. 1892.

ized by strong widespreading growth and mostly smooth twigs; a firm, juicy, bright-colored, thin-skinned fruit, which is never flattened; a clinging, turgid, comparatively small, rough stone, which is sometimes prolonged at the ends but is never conspicuously wing-margined, and by comparatively thin and firm shining, smooth, flat, more or less peach-like, ovate-lanceolate or ovate long-pointed leaves, which are mostly closely and obtusely glandular-serrate, and the stalks of which are usually glandular.

BLOSSOMS OF SOPHIE
Somewhat reduced

"The varieties are intermediate between the Americana and Chicasaw groups. The fruits lack entirely the dull-colored, compressed, thick-skinned and meaty characters of the Americanas, and approach very closely to the Chicasaws. They are usually covered with a thin bloom and are more or less marked by small spots. They are variable in period of ripening, there being a difference of no less than two months between the seasons of some of the cultivated varieties. In color they range from the most vivid crimson to pure golden yellow. The botanical features of the species are not yet well determined, and

it is not impossible that more than one species is confounded in it."

This description suits the Wildgoose type as understood to-day, though the view presented in 1892 may now be modified in two important technical particulars. First, we regard *Prunus hortulana* no longer as a species in the ordinary acceptation of the term, but as a conglomerate company of natural hybrids. Second, several varieties at first included in the Wildgoose group are now referred to the Wayland type, and discussed in the preceding chapter.

Plums of the Wildgoose group are largely planted for home use and market in some localities, mostly south of Mason and Dixon's line. They thrive much farther north, however, and are sometimes successfully and profitably grown as far north as Massachusetts and Kansas. They can be grown even farther north. (See Chapter XXXII.) The fruit is solid and ships well, and its bright red color and transparent skin make it very attractive, so that it ordinarily sells well. The blossoms appear abundantly at a season about midway between the Chicasaws and the Americanas. In general they are remarkably self-sterile, and some provision for cross-pollination is to be regarded as a necessity. Their special sexual affinities and eccentricities are discussed further in the chapter on pollination.

XIII

The Chicasaws

THE Chicasaw plums have a characteristically southern range, the natural northern limit of the species being along the line from Delaware to Kentucky. Through the southern Atlantic and Gulf states it is widely distributed, being found in dense thickets along streams, at the edges of fields and in various situations, frequently near human habitations.

From various evidences it seems possible that this species is not native in the southern states, but was introduced there by the Indians. If this be true, the geographical origin of the Chicasaws is very uncertain. Their southern range indicates a southern origin, and it is thought that perhaps they came from Mexico. This supposition loses force, however, from the fact that no indigenous species of plum is now

H. A. TERRY of Iowa

Originator of many of our best native-bred plums

known in Mexico, except certain straggling specimens which have crossed the Rio Grande river from Texas and New Mexico. After all, except for a few suspicious curcumstances, the Chicasaw plum behaves like an indigenous species in the southern states. It makes itself thoroughly at home, holding its own territory in competition with native species, and for all practical purposes may be considered as belonging there.

The tree is rather small, occasionally reaching a hight of twenty to twenty-five feet, with a diameter of four to five inches. But usually it takes the shrubby form, growing five to ten feet high, and branching from the bottom. It also throws up many suckers from the roots, so that the trees or shrubs are commonly found in dense thickets.

The branches are slender, sometimes rather zigzag, lustrous when young, but becoming grayish after the second year. Occasionally they are a trifle thorny, by the suppression of short side branches. The leaves are small and shining, trough-shaped and minutely serrate with glandular teeth. The petioles are sometimes glandular. The flowers appear rather early. In the orchard they bloom next after the early Japanese varieties and with the later sorts of that class. Cluck, however, is distinctly late blooming, and a few other varieties are not specially early. The blossoms are small, white and abundant. In general they are more vigorous sexually than the blossoms of *Prunus americana*, bearing more abundant pollen and showing fewer defects in the female organs. The pollen seems to be very prepotent, not only upon other varieties of the Chicasaw group, but upon those of the Wildgoose and Japanese groups, and upon some varieties of the Miner and Americana groups.

The fruit is mostly spherical or spheric-oval and

without a suture. The colors are lemon yellow and clear bright red, the latter predominating. The fruits are nearly always marked with many large, conspicuous yellow dots, and have a thin whitish bloom. The flesh is always yellow, juicy and somewhat stringy, with a sprightly vinous flavor. The stones are nearly round, and are always turgid,—that is, thickened, instead of being flattened sidewise like many of the Americanas and Nigras. So far as I know they are all clingstones. The fruit is often gathered from the wild trees, and is used for jellies and preserves.

The species does not usually succeed well north of its natural limit, though several of the varieties do fairly well in western New York. Pottawattamie, which seems to be considerably hardier than the others of this group, succeeds as far north as central Iowa and Vermont. For general orchard planting, however, the Chicasaws are not to be recommended north of New York, Wheeling, West Virginia, Cincinnati, St. Louis and Kansas City.

XIV

The Sand Plum

THE sand plum is a personal friend of mine. This fact may prejudice the following biography, though I freely admit that the sand plum is not a pomological wonder. Still, this was the first plum I knew, and it was a good friend in those days when we lived on the untamed prairies of Kansas and went yearly into the sand hills along the Arkansas river to the plum harvest.

The sand plum is a dwarf, rather unsymmetrical bush, ranging from two to six feet in hight. Its stature is what chiefly distinguishes it from the common Chicasaw plum. Besides being dwarfer than the ordinary Chicasaws, it has smaller leaves and blossoms, and the stems have often a more zigzag ap-

SAND PLUMS

Gathered from the wild trees, Manhattan, Kansas

pearance. There are no test characters by which these plums can be separated with certainty from the true Chicasaws. Still, they are sufficiently distinct to be considered by themselves and to have been made a separate species by Professor Sargent.

In a wild state the fruit is comparatively very fine. While all native species of plums seem to have been gathered from the wild trees and used with considerable satisfaction by early settlers, no other plums seem to me to have served the pioneers so well.

The sand plum is found wild chiefly in Kansas in detached areas on the sandy lands along the Arkansas and Republican rivers. It is said to occur also in southwestern Nebraska. It is occasionally found in Oklahoma, and there is good reason to believe that it reaches also into the Texas panhandle.

A letter written me by Mr. D. M. Adams of Sumner county, Kansas, contains so much information about these plums that I venture to reproduce it entire. He says:

"This plum grows wild in this country along the Arkansas river. The best patch of wild ones I have seen was on the bank of the Arkansas at the mouth of Slate Creek, a few miles above Gueda Springs. There was about forty acres in the patch that had been left in its natural state. The ground looked like a barren sand bank. There was no grass, weeds, or any other shrubbery except a few wild grapevines. It was a hot day in August. The sand was so hot that the boys could not walk over it in their bare feet. The bushes grew down to high-water mark in the river. Most of the hills were about ten feet above the level of the river. The person that owned the land sold the fruit and let us pick it. They watched and had it picked clean as they went. It was about the middle of August. They had been picking for a month, and thought that there would be plums there for another month. The bushes were from three to six feet high. The plums were brown, the size of a May cherry, the size of Damson plum. Some were a bright scarlet, the color of a cherry, others were a bright yellow, or amber color. Where they had not been picked, the bushes were bending to the ground with their load of fruit. The fruit was so thick as almost to hide the leaves.

It was the grandest sight in the fruit line that I ever saw. They looked like a large flower garden at a short distance. We cultivate them in our yards and gardens. All you have to do is to set out a few bushes. Soon they will spread until they will make a thicket that one cannot walk through. When they are in bloom they look like a bank of snow. They begin to ripen about the same time that wheat does, and continue to ripen for six weeks to two months. They do not all ripen on the same bush at once. There will be ripe ones and others perfectly green on the same limb at the same time. They are one of the best fruits for cooking that grow. We have a patch of four or five square rods. It gives us all we want while they are going, and then we have a supply for canning. Here is one of the most valuable fruits. Chickens prefer them for a shelter to anything else, both in hot and cold weather. We have a tight straw shed, open on the south side. Days when it was below freezing, the chickens would stay in the plum patch in preference to the sunny shed. Some of the small-sized plums have a bitter taste, still are very juicy and acid. I do not know how they will succeed further north. Since I have been here I have sent several lots of seeds and roots to different parties in different states, but have never got reports from any of them. I sent a lot of seed to a nurseryman in Indiana. He advertised them in his catalogue as 'Kansas Dwarf plum.' "

Only a few varieties have been propagated by nurserymen, and none of these has attained any reputation. The wild plants have very often been taken into cultivated gardens by settlers in Kansas, but they have seldom thrived under cultivation. The sand plum does not seem to be adapted to a wide diversity of soils or climate. In Maryland it blights badly with monilia. Still, this group of dwarf plums is so interesting and so promising in some ways that one cannot help expecting something of it in the future.

LUTHER BURBANK of California

Famous plant breeder and originator of many fine plums

XV

The Hybrid Plums

HYBRID plums first really claimed the notice of American pomologists in 1893, when Luther Burbank offered for sale his varieties, Golden and Juicy, with certain others which have become less well known. Two years later several supposed hybrids produced by J. S. Breece, of Fayetteville, North Carolina, were described in the report of the United States Pomologist. These were Garnet, Lannix, Monolith, Scribner and Sirocco. These have not yet been generally introduced. Since 1895 numbers of hybrids have been brought to light by Luther Burbank of California, W. A. Yates, F. T. Ramsey, A. L. Bruce and T. V. Munson of Texas, G. L. Taber of Florida, J. L. Normand of Louisiana, Theo. Williams of Nebraska, C. E. Pen-

nock of Colorado, J. S. Breece of North Carolina and others.

The number of introductions in this class is rapidly increasing. In the fall of 1898 the present writer published the first general discussion of the hybrid plums.* In this bulletin notes were given of 50 varieties for which a hybrid origin had been suggested, a few of which were decided not to be hybrids, but most of which were thought to be authentic.

The career of the hybrid plums was thus fairly and officially begun. An epoch in plum development was opened. No one can foresee the consequences; but anybody who considers the case in its various bearings will readily see that there are wonderful possibilities in the hybridization of plums. Hybridity has played an important role among American grapes; but the circumstances all promise more important results from the crossing of plums.

It will be well to recur at this point to present beliefs, elsewhere set forth, regarding the origin of the great Hortulana series, comprising the Wildgoose, Wayland and Miner groups. These are now thought to be natural hybrids in various degrees of combination between *Prunus americana* and *P. angustifolia*. We thus find that plums hybridize freely when growing wild in the woods. Abundant evidence recently accumulated goes to show that they also hybridize extensively when grown together in the orchard. With certain favorable combinations of species growing together (e. g., *Prunus triflora* with *P. angustifolia*), probably a large majority of the fruits are cross pollinated; and if the seeds be planted the resulting offspring will show more hybrid than purebred specimens.

*Vermont Experiment Station Bulletin No. 67. 1898.

It is partly on this account that we find the hybrid plums often occurring in groups of three, or six, or ten varieties of a kind. Thus Mr. Breece, of North Carolina, has a group of Triflora-Hortulana hybrids; the late D. H. Watson, of Texas, raised a very homogeneous lot of Triflora-Angustifolia hybrids. Mr. J. L. Normand of Louisiana has grown a similar series. Even among the multifarious productions of Mr. Burbank, one cannot help noticing the prominence of the Triflora-Simonii crosses. Both in nature and in cultivation, hybrid plums seem to occur in groups.

How shall we know a hybrid plum? This is sometimes a difficult question. The views of the author have been elsewhere set forth, but it seems proper to repeat them here. There is a strong prejudice in almost all quarters against admitting the hybrid origin of any plant except upon the most indubitable evidence. This is a good, conservative, scientific principle, but it may be carried too far. It is rather a near-sighted way of looking at the matter, though not uncommon, to think that careful hand-pollination of emasculated blossoms, followed by painstaking rearing of the seedlings, furnishes the only basis upon which hybridity can be really certified. We are taught by all our theories, and know from observation of the facts, that hand-pollinations made with the greatest care give very uncertain results. The offspring when secured may resemble one parent alone, in which case the strong presumption is that the hybridization was a failure. That is, the extrinsic characters of the plant are relied upon for the final proof of its parentage.

This overturns at a stroke all our prejudices, but it puts the subject in its proper light. On the whole, the practical horticulturist cares very little whether a plant is a hybrid or not, unless its visible characters show some evidence of its pluri-specific parentage.

With plants occurring wild, the distribution of a strange form is an important evidence of hybridity, as in the case of *Prunus hortulana*; and for a study of hybridity in general, authentic pedigrees are indispensable; but for all practical, and for most scientific purposes, intermediateness of character is the only practicable and the most reliable test of hybridity.

The greatest caution, however, must be exercised in following out this rule. It will not do to jump at conclusions in such an intricate matter. No one can determine at the first glance whether the characters of a new variety are drawn from several definable sources. It is often difficult to decide what the relationships of a given variety are, even after long study of all the characters of plant, foliage, blossom and fruit. It is a very serious problem to classify some varieties which belong to only *one* species! Before the pomologist refers a new plum to *two* species, he must give the evidence his most searching scrutiny.

In the present work the hybrid plums are put into a group by themselves. It will be increasingly difficult and unsatisfactory, as time goes on, to maintain this group and to mark its boundaries. There is nothing homogeneous about a group labeled "hybrid plums." What does a hybrid plum look like? Why, like *Prunus simonii*, or perhaps like a Chicasaw, or maybe like an Americana. It is necessary, therefore, if we are to tell anything about the varieties which we classify as hybrids, to add something to the classification. When we say a plum belongs to the Wayland group, any plum expert has a pretty good idea of what the variety is like. But when we say a variety is a hybrid, he knows nothing about it.

The natural way to classify a hybrid is to name the parents from which it has sprung. But such a classification is misleading unless the hybrid variety

partakes of the characters of the parents to which it is referred. To be sure, it is quite possible that a hybrid may have sprung from two given parents and still show the characters of neither. And though this would be an important fact, it is entirely aside from the matter of classification, and classification is of the greater importance. So that, whatever precautions may be necessary in studying the physiology of hybridity, the characterization and classification of hybrids depends on intermediateness of extrinsic characters alone. Classification is, first of all, a systematic presentation of apparent resemblances and differences.

A hybrid, then, is to be classified by referring it to the several species whose characters it exhibits. But different hybrids of the same parentage may exhibit their several characters in various combinations or in different degrees. It is the business of the pomologist to point out these different combinations and degrees in his descriptions.

One of the important questions for the plum breeder, and one of the interesting ones, too, for the pomologist, is, What are the limits and affinities of varieties in crossing?

It may be proper to introduce some remarks regarding the utility of the various species in hybridizing. It is, of course, too early to draw conclusions. The following remarks partake more of the character of a prophecy,—what some folks call guesswork.

Prunus domestica.—This species is comparatively difficult to hybridize. It may be hoped, however, that it will give good results. The solid, meaty flesh and the freestone character of leading Domesticas are especially desirable for combination with the higher flavor, better color, freer growth, and other desirable qualities of native species. The writer looks with especial favor upon the combination of Domestica with Americana parents.

The Damsons.—The author sees no probability of good results from hybridizing the Damsons with anything.

The Myrobalan group.—Several varieties have been examined which undoubtedly partake of Myrobalan stock. None of these, however, has shown any promise of filling an important place in the pomological field. Still this stock seems to be especially favorable for bridging over the gap between the Domesticas on the one hand and the Japanese and American varieties on the other. The Myrobalan varieties seem to hybridize in both directions without much difficulty; and through their intervention we may be able presently to effect certain desirable combinations which now seem difficult or impossible.

Prunus simonii.—"The best of all the plums in hybridizing," says Mr. Burbank, and his results seem to justify him in the opinion. Although *Prunus simonii* itself is regarded by most horticulturists as a very worthless thing it seems to have a thoroughly respectable progeny. The peculiarly disagreeable taste which characterizes the parent seems never to be present in hybrid offspring. Instead one has a firm, meaty flesh, with a rich, sweet, sugary flavor. The size, color and flesh of the Simon plum are all desirable, and though it is hardly probable that other hybridizers will have the same success with this species that Mr. Burbank has had, it has nevertheless fully proved itself worthy of consideration.

Prunus triflora.—The Japanese plums cross with other groups with great facility, especially with the Chicasaws and Hortulanas. Crossing with the Chicasaws, however, seems inclined to give fruits with soft, stringy, watery flesh clinging to the stones. These are among the more undesirable characters of the Chicasaws, and might be wisely avoided by using other combinations. Although it is much more difficult to combine *P. triflora* with *P. americana,* the results are likely to prove much better. The good character of the Triflora Simonii crosses is especially to be remarked.

Prunus angustifolia.—The Chicasaws cross readily with several other groups, in fact, with almost everything. They do not seem, however, to bring any very desirable characters into such combinations, and though a few promising Chicasaw hybrids are on record, this species cannot be recommended for hybridization.

The Wildgoose group.—The remarks made regarding the Chicasaws apply in the main to the Wildgoose group. The latter are to be preferred, however, in making hybridizations.

The Wayland group.—These varieties are perhaps a little better adapted to the needs of the plum breeder than are the Wildgoose sorts.

The Miner group.—These so closely resemble the Americanas as to have most of their good qualities. They seem to

combine more readily with other groups, however, and are to be regarded with favor.

Prunus americana.—The finest flavor known in plums belongs unquestionably to the Americanas. The firmness of flesh and hardiness of tree are also qualities of paramount practical importance. Partly on account of their late-blooming season, and partly perhaps on account of a lack of affinity for other species, they do not hybridize so readily in the orchard. For the same reasons they are not so convenient for the plant breeder. In spite of this they are among the most promising plums for the production of valuable hybrids.

XVI

Other Kinds of Plums

BESIDES the types of plums already described, there are several which are, for the present, of minor consequence in the pomology of America. They all hold unknown possibilities, however. No one may prophesy what good things we shall yet see developed from them. Already the plum amateurs are gathering them into their gardens, the experimenters are crossing and blending, improving and selecting, and the nurserymen are hungrily waiting for some novelty to introduce. The following list is not absolutely complete, but it numbers all those types which have been sufficiently cultivated to have any interest for the horticulturist.

The Beach Plum.—This is undoubtedly the most important native species yet unconsidered. It is rep-

resented by a large and variable species, *Prunus maritima,* ranging from New Brunswick to Virginia, and occurring again in a detached area at the head of Lake Michigan. From Virginia southward into Alabama, the same type is represented by what Dr. Small calls another species, and which he names *Prunus injucunda.** The examination of a limited amount of material, however, leaves me with the opinion that this so-called species is rather to be considered as a closely related sub-group of the Beach plum. At any rate, it represents the same general class. Another closely related type is *Prunus gravesii,* also described by Dr. Small. This is found only on a very restricted area near New London, Connecticut, and does not promise to be of much immediate value to the plum breeder.

There are other rather striking variations among the Beach plums which have not yet been described botanically.† All these divergencies from the main type, however, have a special interest for the plum student, because they show the natural variability of the species. It is a species very apt to break out in new forms; and it doubtless holds many strange possibilities yet in store. Several of our best plum specialists are now at work with this group, and are full of faith that they shall some day reap some good results.

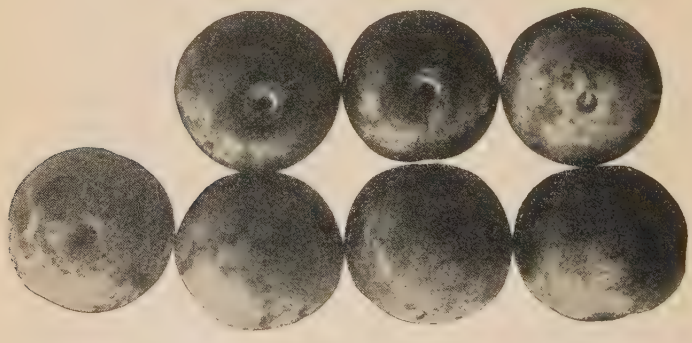
The fruit of the best wild forms of the Beach plum is round, black, about half an inch in diameter, and fairly agreeable to the taste. It does not seem to have been collected and used for culinary purposes so often as most wild plums; but I doubt if this is the fault of the fruit itself. It has been due rather to circumstances, I fancy.

There is a single named variety of the Beach plum in commerce. This is Bassett (Bassett's American).

*John K. Small. Torrey Bot. Club Bulletin, 25:149. 1898.
†See Vermont Experiment Station Report, 12:234. 1899.

Others have been selected, but have thus far been propagated only by numbers or other temporary designations.

The Pacific Plum.—One of the most interesting of our native species is the Pacific plum, *Prunus subcordata*. This grows in the elevated regions of southern Oregon and northern California. It has been noticed and the fruit gathered by settlers, and attempts have been made to bring it into cultivation after the same manner as all the other prominent native species. Pro-



BASSETT

The best cultivated type of the the Beach Plum

fessor Wickson says of it:* "This must be regarded as one of the most useful of our native fruits. Even now, when the plum varieties of all the world have been introduced, residents in some of the Sierra regions of California, where an excellent variety (*kelloggii*) abounds, prefer it to the cultivated fruit, both for eating and for preserving and jelly making."

Luther Burbank also considers this a promising type, and uses it freely in his hybridizing experiments.

*California Fruits, 3d ed., 39. 1899.

I have seen several interesting hybrids which he has produced by combining this with various other species. This type more closely resembles the European plums of the Domestica group than any other of our American species. The fruit is comparatively large, the flesh firm, and the quality uncommonly good. The only cultivated variety of this type of which I have ever heard is the one mentioned by Bailey* under the name of Sisson.

The Oklahoma Plum.—This is a name which I have here applied for the first time to an interesting native species which has hitherto never been able to afford the luxury of an English name. The botanical name, *Prunus gracilis*, has no special appropriateness. It grows from southern Kansas to northern Texas and eastward to Tennessee, but reaches its principal development along the Cimarron river in Oklahoma and eastward in the Indian Territory. It is a dwarf, rather harsh-leaved, small-fruited plum, more closely resembling the Beach plum than any other. In fact, the two species seem to be near relatives. The fruit is sometimes gathered and sold in the local markets, and has about the same culinary value as inferior grades of the wild Americanas. The plant has some ornamental value; and the fruit is good enough to give promise of improvement. The type is variable like the Beach plum, and the variations, strangely, seem to run in the same lines. There are no named varieties.

The Alleghany Plum.—This is a small, straggling tree or bush, which grows wild over a restricted area in Pennsylvania. Professor Bailey says: "Its merits as a fruit-bearing plant seem to be so inferior to those of the Americana plums, that I do not look for any attempt to ameliorate the species for many years to

*Evolution of Our Native Fruits, 216. 1898.

THE OKLAHOMA PLUM. PRUNUS GRACILIS

Fruit taken from tbe wild trees

come." Professor Sargent, however, presents a more hopeful view. He says that "the fruit is collected in large quantities, and is made into excellent preserves, jellies and jams, which have a considerable local consumption. It . . . possesses considerable culinary value, and . . . will probably be improved by selection and cultivation." It seems to me to be one of the least promising of the native species. There are no cultivated varieties.

The Southern Sloe.—The few specimens of the Southern sloe, *Prunus umbellata*, which I have seen, were not prepossessing. The fruit is small and hard and bitter. It grows on a small tree of ten to twenty feet in hight, with leaves resembling the narrow-leaved forms of the Beach plum. It is distributed from South Carolina to southern Arkansas and Texas. The fruits are sometimes gathered and used, but are generally held in small esteem, and is suggested by one of the vernacular names, Hog plum. I have never seen this plum in cultivation.

The Dwarf Cherries.—Mr. Pennock's Improved Dwarf Rocky Mountain cherry is about the only variety in cultivation representing another interesting type of plum, or dwarf cherry. This is derived from the western form of the dwarf sand cherry, *Prunus pumila besseyi*. This type, which grows from Nebraska eastward, has been the subject of many experiments. Numerous selections have been made from it, and several hybrids have been produced. None of the former has been named, so far as I know, except the one mentioned above. Of the hybrids, the one which has attracted the most attention is the so-called Compass cherry, described in this work among the hybrid plums.

The plant is dwarf, bushy, variable and fruitful. It has many of the qualities which a plum breeder would naturally look for. Besides this, it is exceed-

ingly hardy, so that it has had a special attractiveness for the fruit growers of the cold northwest. This is a part of the reason why it has been so urgently tested as a garden fruit. With all the work still being given to it, it would be strange if no further advances should be made.

THE SAND CHERRY. PRUNUS PUMILA

From Vermont

The eastern form of the sand cherry, the typical *Prunus pumila*, is even dwarfer than the western form, with smaller leaves and smaller fruit. It is not entirely worthless or without promise as a fruit plant; but compared with other species it has never appeared to be of so much value as to attract the attention of plum breeders. It is still here; and perhaps some day it, too, will render an account in its own behalf.

The Choke Cherry.—The common choke cherry,

Prunus virginiana, has some medicinal value; but it has also some culinary value. When the fruits are perfectly ripe they are not bad to eat out of hand. The slight bitterness which they still retain is rather agreeable than otherwise. Good jelly can be made from the fruit if taken before it is too ripe; and first-class cordials and liqueurs may be distilled from it by the man who knows how. The choke cherry has been cultivated more or less at different times; and though it has never been recommended as a profitable garden crop, the persons who have grown the occasional trees have doubtless reaped some satisfaction for their labors. Some special variations have been noted among these cultivated choke cherries,—for instance, a white-fruited variety,—but none of these has been named.

The Black Cherry.—I once heard a man recommend the black cherry for ague. His directions were these: "You should put five of the cherries in a five-gallon demijohn of good whisky, and drink some every half-hour till you feel better." "But it seems to me," I said, "that five cherries is rather a small proportion." "Not at all," he replied; "they are the most important part of the prescription. As soon as you put them in the demijohn they will sink to the bottom; and then the idea is to get to the cherries just as soon as possible!"

Mr. Sudworth records that this species is sometimes called the whisky cherry. I have never heard, however, of its being cultivated for the purpose mentioned.

It is a noble forest tree in some parts of the United States, and produces perhaps the most valuable wood of any native species; but as a fruit tree it is so inferior that I fear it will never gain a place in the orchard.

XVII

The Domestica Plums Named and Described

AGEN (Prune d'Agen, French prune, Petite prune).—Fruit oval, slightly pear-shaped; size small; cavity shallow; stem slender, rather long; suture faint; color reddish purple; dots many, white; bloom bluish; flesh greenish-yellow; stone long oval, hardly flattened, free; quality good to best, season late. Tree not a large grower, but usually fairly productive.

Of European origin. In the province of Agen, France, they cultivate prunes extensively, the staple sort being of the type of our Agen, or Prune d'Agen, described above. But it appears to the writer that, like other striking old types, this one has taken on considerable variations. It has doubtless often been reproduced from seed. Numerous references to this plum may be found in European literature. (The reader may consult especially Bruguiere, Le Prunier, chap. i). The variety as grown in this country seems to be fairly uniform, however, and is identical with the principal French type of this name (Cf. Wickson, California Fruits, 3d ed., p. 276). It is probably the most important drying prune grown on the Pacific coast. In the eastern states it has no reputation except as an amateur's plum. Its high quality recommends it to the fruit lover.

ANGOULEME (Reine Claude d'Angouleme).—Fruit round; size medium; cavity shallow, flaring; stem stout, rather long; suture faint; apex slightly depressed; color dull green, tardily turning creamy yellow; dots minute, light colored; bloom white; flesh greenish; stone small, round, moderately flattened, free; flavor rich and sweet; quality excellent; season of Green Gage.

This variety does not seem to be distributed in the United States, but I have included this description, made from a fruiting tree in the collection of Ellwanger & Barry, Rochester. The variety is much like Green Gage, but is free.

AGEN

ARCH DUKE.—Fruit oval, with a neck; size large; cavity medium size, deep, abrupt; stem medium; color dark blue; dots numerous; bloom heavy, bluish; flesh yellow; stone small, oval, cling; flavor sub-acid; quality good; season medium late.

Imported from England eight or ten years ago by S. D. Willard of western New York, and thought by him to be a good market plum.

ARCTIC (Moore's Arctic).—"Tree rather vigorous, with an upright, round head, and with branches somewhat spreading.

Fruit roundish, oval; stalk three-fourths inch long, slender; cavity very slight; apex hardly noticeable; suture indistinct; color black, with a thin, blue bloom; flesh tender, juicy, yellowish amber, very firm, nearly sweet; pit small, oval, nearly free. Season August 16; size, medium. A hardy and generally productive variety, but the fruit is much too small for market purposes."—Michigan Experiment Station Bulletin 169:241.

This variety has been heavily advertised and widely sold in the last few years. Aside from being hardy, it seems to have no special recommendation.

Bavay (Bavay's Green Gage, Reine Claude, Reine Claude de Bavay).—This variety is often unnecessarily confused with Green Gage. It is larger, later, and a stronger grower. The trouble is that both names, Reine Claude and Green Gage, stand for a certain group of plums, as well as for certain special varieties. The history of this group and its general characters are fully discussed elsewhere, and need not be entered into now. This variety, which has come to be called Bavay in this country, but which really ought to be called Reine Claude, is an old, old European variety. In fact, no one can tell just when this or the present variety known as Green Gage originated and began to be propagated by grafting in their exact present forms.

This is one of the finest plums known, and is indispensable for home use. It is also valuable for certain markets, though it has not been found so profitable a shipper as brighter colored varieties.

Belle (Belle de Septembre).—A large, late, reddish purple handsome old European variety of no special distinction, but still retained in some collections.

Bittern.—Fruit oval, with a slight neck; size small; color purple; dots few, minute; bloom bluish; skin thick; flesh firm, greenish; stone long, oval, cling; flavor brisk, sub-acid; quality good; season late summer.

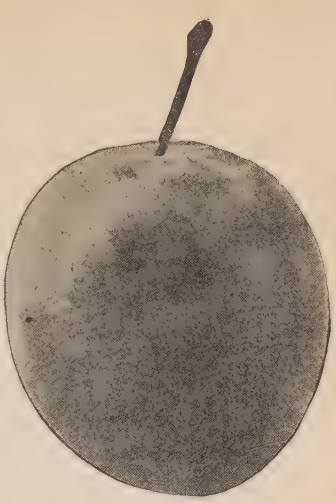
This plum was sent by S. D. Willard to the United States division of pomology, from whose report the foregoing description is taken.

Bleeker (Bleeker's Gage).—Fruit round, oval; size medium large; cavity shallow, rounded; stem rather long; suture shallow; color creamy yellow; dots many, small, yellow; bloom white; skin thin; flesh yellow, firm, meaty; stone medium size, round-oval, rough, thick, cling; flavor rich and sugary; quality extra good; season early; tree a tall upright grower.

Originated at Albany, New York, with a Mrs. Bleeker many years ago. It was formerly very popular and still deserves to be wherever the Domestica plums succeed.

BLUE IMPERATRICE. — Fruit heart-shaped; size medium to large; cavity medium shallow, rounded; stem an inch or more long, rather slender; suture shallow; apex pointed; color dark blue; dots several, sharp, yellowish; bloom blue; skin tough; flesh yellow; stone medium size, oval, obtuse-pointed, flattened, nearly free; quality good to best; season late, hanging on the tree long after ripe.

An old European variety and an excellent late market plum. Very productive.



BLUE IMPERATRICE

BODDAERT (Boddært's Green Gage).—Fruit nearly spherical; size, medium; cavity medium deep, rounded; stem an inch long, pubescent; suture faint; color creamy yellow; dots greenish and pinkish; bloom white; skin thin; flesh yellow; stone round-oval, small, not flattened, free; quality good; season medium; tree vigorous, moderately upright.

BLEEKER

A variety brought over from Europe and belonging plainly with the Green Gage type.

BRADSHAW (Blue Imperial, Niagara?).—Fruit obovate; size medium to large, depending on cultivation; cavity shallow, usually with a ring about the stem; stem about an inch long; suture shallow; apex rounded; color dark purplish red;

dots several, large, yellowish; bloom blue; skin strong; flesh greenish-yellow; stone rather small, long oval, with a neck, slightly flattened, nearly free; flavor rich and sweet; quality good; season medium; tree a good grower.

Origin undetermined. Niagara is generally thought to be the same thing, though this is disputed by some.

Bryanston (Bryanston's Gage).—Fruit oval or roundish; size medium; cavity shallow; stem rather stout; suture shallow; apex a trifle depressed; color dull greenish-yellow, with a darker shading in the sun; bloom light; flesh yellow; stone cling; quality good to very good; season late.

Belongs to the Green Gage group and presents no points of superiority over Bavay.

BRADSHAW

Clyman.—Fruit roundish; size medium; suture distinct; apex slightly flattened; color dark purple; bloom heavy, bluish; flesh firm, yellow; stone free; quality good; season early.

A seedling grown by Mrs. Clyman in the Napa Valley, California, in 1866.

Columbia.—Fruit round; size medium; cavity medium deep, rounded; stem medium long; suture shallow; color blue; dots several, dull yellow; bloom bluish; flesh greenish-yellow; stone round-oval, but little flattened, nearly free; quality good; season moderately late.

Originated many years ago with L. U. Lawrence, Hudson, New York.

Communia.—The same as Lombard, or very nearly like it.

Copper.—Fruit oval; size medium; cavity shallow; suture none; color metallic-bluish; quality good.

Of European origin and somewhat recently boomed in this country, though long ago known here. Thought by some to be a good market plum. The name, Copper, has been applied

to several different varieties in this country. The one here described is the one generally grown in New York and Michigan.

Czar.—Fruit round-ovate; size medium to large; cavity narrow; stem, half an inch long, slender; suture a line; apex slightly depressed; color dark purple; bloom bluish; flesh yellowish, firm; stone free; flavor sweet and pleasant; quality good; season early; tree vigorous and upright.

COLUMBIA

This has been recently planted in western New York and is thought to have some value.

Deaton.—Fruit rounded; size medium large; cavity deep, abrupt; stem medium, stout; suture shallow; color greenish-yellow; dots a few, large, yellow; bloom whitish; skin tender; flesh greenish; stone medium size oval, not flattened, cling; quality good.

A new seedling of Green Gage from Iowa. Introduced by J. Wragg & Son, Waukee, Iowa.

De Caisne.—This variety I know only from the description in the catalog of Ellwanger & Barry, which says, "Very large, yellow, excellent, resembles Golden Drop, but ripens much earlier."

Diamond.—Fruit oval; size medium to large; cavity medium deep, abrupt; stem short, stout; suture shallow; apex slightly pointed; color blue; dots minute; bloom blue; stone medium size, oval, oblique at both ends, slightly flat, cling; quality fair; season medium.

Of English origin.

Drap d'Or (Cloth of Gold).—Fruit round; size medium or smaller; cavity shallow; stem slender; suture indistinct;

DEATON

color yellow; dots a few, some reddish; bloom thin, white; flesh yellow; stone free; flavor rich and sugary; quality very good; season early.

Very much like Green Gage, but a week earlier. An old European variety, now hardly known in America.

Duane (Duane's Purple).—Fruit irregularly egg-shaped; size large to very large; cavity shallow, rounded; stem slender, medium long; suture shallow; color red or purplish, like Lombard, but a little darker, changing to dark blue; dots several, large; bloom whitish or gray; skin rather tough; flesh light yellow, meaty; stone medium size, oval, blunt, rough, slightly flattened, cling or nearly so; quality good; season early; tree vigorous.

Originated with James Duane, Duanesburgh, New York. A deservedly popular plum wherever the Domesticas succeed, and favorably known in Europe.

Emily May.—The following notes are from Craig: Fruit received from Lillian A. Trotter, Owen Sound, Ontario, Canada. Form oval, slightly egg shape; size large; cavity deep, narrow; stem stout; suture a well marked groove; apex flattened; surface smooth; color clear, light yellow; dots wanting; bloom very thin, lilac; skin thin; flesh firm, melting, tough next stone; stone small, surface rough, free; flavor delicate, primrose; quality good.

DIAMOND

A large, handsome plum, of Pond seedling type, but of better quality.

Englebert (Prince Englebert).—Fruit regular oval; size medium; cavity shallow to medium, rounded; stem slender; suture faint; color blue; dots many, distinct, light colored; bloom blue; flesh yellow; stone medium size, oval, moderately flattened, rough, free; quality good; season medium or early; tree a good grower; bears heavily in small clusters.

Field.—Fruit oval; size large; cavity small, narrow; stem an inch long; color dark blue, almost black; bloom blue; flesh greenish-yellow; stone cling; quality good; season medium.

Said to be a seedling of Bradshaw, which it resembles in some respects.

FOTHERINGHAM.—Fruit obovate; size medium; suture distinct; color reddish-purple; bloom bluish; flesh greenish-yellow; stone free; quality good; season medium.

An old English variety, little grown here.

GALOPIN (Violette de Galopin).—Fruit spherical or slightly oblate; size medium; cavity shallow, rounded; stem short and stout; suture shallow; color blue; dots many, conspicuous; bloom blue; flesh yellow; stone medium size, oval, with a short neck, slightly flattened, nearly free; quality fair to good; tree rather poor and straggling.

This European variety does not seem to be known in this country, but I have ventured to include this description, made from a specimen in the collection of Ellwanger & Barry, Rochester, New York.

DUANE

GIANT (Giant Prune).—A very large plum introduced by Luther Burbank in 1893. Wickson thus describes it: "Very large, dark crimson on yellow ground; flesh yellow; flavor good; freestone; a shipping plum; rather disappointing as a drying plum."

GERMAN PRUNE.—Fruit long oval; size small to medium; cavity very shallow; stem rather slender, medium long; suture hardly more than a line; apex somewhat pointed; color blue; dots a few, scattered; bloom blue; flesh greenish or slightly yellow; stone small, oval, pointed, moderately flattened, very free; quality hardly more than fair; season medium; tree strong, tall grower, productive.

One of the very oldest varieties known, being grown over wide areas in Europe since before the beginning of horticultural history. It has often been grown from seed, and this no doubt accounts for the fact that there are a number of different plums passing under the name of German Prune. The foregoing description is made from the stock tree of Ellwanger

ENGLEBERT

& Barry, Rochester, New York, which is marked "True German Prune," and which is probably the most reliable type in America. The variety has been very popular for commercial planting, for what reason is more than I can say. There are certainly many better market plums to choose from at the present day.

GLASS (Glass Seedling).—Fruit irregular, round-oval; size medium to medium large; cavity shallow, wide, flaring; stem rather long; suture a line; apex slightly depressed; color blue; dots white; skin thick, firm; bloom blue; flesh greenish; stone oval, pointed, flattened, cling; quality fair; season medium.

Originated with Alexander Glass, Guelph, Ontario. Very similar to Quackenboss.

FIELD

GOLDEN DROP

GOLDEN DROP (Coe's Golden Drop, Silver Prune).—Fruit oval, with a short neck, the two halves unequal; size large to very large; cavity very shallow and abrupt; stem medium long, stout; suture deep; apex somewhat depressed; color golden yellow; dots very many, yellow; bloom

yellow, flesh firm, meaty; stone medium large, long, pointed, somewhat flattened, ribbed at the edge, half free; quality good; season medium late; tree a good grower, with large coarse, rough foliage.

An English variety, highly prized there and here, and an important commercial prune on the Pacific coast, where it is incorrectly called Silver prune. It is, however, hardly suitable for general planting in the eastern states.

GOLIATH

Golden Prune.—Fruit long, oval; size large; cavity very small and abrupt; stem short, stout; suture shallow; color creamy, yellow; dots many, yellow; bloom thin, gray; skin thin; flesh yellow, firm; stone medium size, oval, rough, nearly free; quality fair to good; season medium.

A seedling of Italian prune, grown by Seth Lewelling of Milwaukee, Oregon.

Goliath.—Fruit round or round-oval; size medium to large, depending on cultivation and crop; cavity medium, gently rounded; stem short, stout, pubescent; suture shallow;

color dark red or purplish; dots several, distinct, yellowish; bloom blue; flesh greenish-yellow; stone medium large, round-oval, blunt, winged, slightly flattened, free; quality fair; midseason.

Grand Duke.—Fruit obovate; size large to very large; cavity narrow, shallow; stem an inch long; suture rather deep; color very dark blue; bloom heavy, blue; flesh yellow, firm; stone oval, hardly flattened, cling; quality good; season

GRAND DUKE

late; tree moderately vigorous, with a spreading, open head. Regarded by many as one of the very best late shipping plums.

Green Gage.—Fruit spherical; size medium; cavity shallow and abrupt; stem medium long; suture faint; color dull greenish-yellow; dots minute and faint; bloom white; skin thin; flesh white; stone small, round-oval, oblique, pointed, somewhat flattened, usually cling, but sometimes more or less free; quality good to extra good; season medium; tree small.

This is one of the oldest known varieties (see history in the chapter on the Domestica plums). It is smaller and earlier than Bavay. One of the most popular culinary plums ever grown for home use. Should be in every home garden.

Gueii (Blue Magnum Bonum).—Fruit oval, cordate; size medium; cavity shallow; stem an inch long, pubescent;

GREEN GAGE

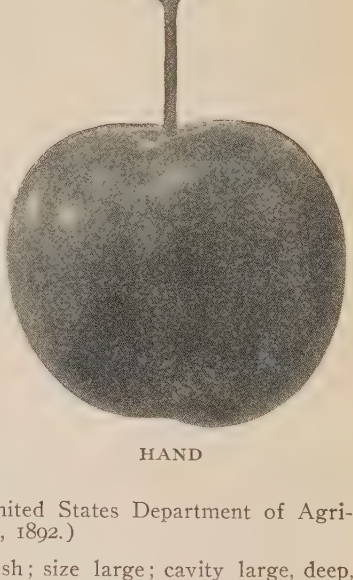
suture shallow; apex somewhat pointed; color blue; dots none visible; bloom blue; flesh greenish-yellow; stone medium size, round-oval, oblique-pointed, cling; quality fair; season medium.

Supposed to have originated with a Mr. Hagaman, Lansingburgh, New York, and named after John Goeway, by

whom it was largely grown. In recent years it has become a popular market plum in New York state.

HAND (General Hand).—Fruit round; size medium to large; cavity shallow; stem slender, medium long; suture shallow; apex slightly depressed; color dull greenish, finally becoming a golden orange; dots minute and indistinct; bloom white; skin thin; flesh yellow, rather soft; stone medium large, oval, blunt, pointed, cling; flavor rich and sweet; quality good to best; season September in this latitude; tree very large and rank and inclined to be a shy bearer.

Supposed to have originated on the farm of General Hand, near Lancaster, Pennsylvania. A magnificent dessert plum, though unprofitable to grow. Green Gage type.



HAND

HARLOW.—Fruit oval; size large; color red to dark purple; dots numerous, small; bloom light blue; flesh greenish, melting; flavor mild subacid; season early.

Originated with S. C. Harlow, Bangor, Me(?), A seedling of Bradshaw, and much like that variety, but earlier. (See United States Department of Agriculture Pomologist's Report, 1892.)

HARNEY.—Fruit roundish; size large; cavity large, deep, abrupt; stem about one-half inch long; suture shallow; color purplish-red; dots large and small; bloom thin, lilac; skin thin, tough; flesh pale yellow; stone medium size, roundish, nearly free; quality good. (See United States Department of Agriculture Pomologist's Report, 1895:45.)

HERON.—Fruit roundish; size above medium; color coppery, dull; dots minute; bloom bluish; skin harsh, acid; flesh greenish-yellow, firm; stone wide oval, large, nearly free; quality good; season late summer.

Described by United States division of pomology from specimens from S. D. Willard, New York.

HUDSON (Hudson River Purple Egg).—Fruit long, oval; size large; cavity medium deep, abrupt; stem long; suture shallow; color red to purplish-red; dots numerous, small; bloom bluish; skin thick; flesh greenish-yellow, firm; stone large, long, pointed, cling; quality good; season medium.

Origin, New York(?).

HULINGS (Hulings' Superb).—"Fruit very large, roundish-oval, with a distinct though shallow suture; stalk strong and stout, set in a round, small cavity; skin rather dull greenish-yellow, thinly covered with a pale bloom; flesh greenish-yellow; rather coarse, but with a rich, brisk, sprightly flavor, adhering to the stone; good; middle of August; tree very vigorous, upright."—Description from Downing.

HUNGARIAN (Hungarian Prune of Downing, not of the Pacific coast; Datte d'Hongrie).—Fruit long, narrow, oval; size small to medium; cavity hardly any; stem long, slender, pubescent; suture very shallow; apex pointed; color dark blue; dots blue; bloom blue; skin thin; flesh greenish-yellow; stone medium size, long, slender, pointed at both ends, ridged at the edge, free; quality poor; season September in New York.

There is a disconcerting list of candidates for the name of Hungarian or Hungary. It is impossible to clear up the synonymy satisfactorily at this time, but the principal references may be noted. They are as follows:

1. The variety called Hungarian prune, with the synonym Datte de Hongrie, by Downing, in the appendix of his work, page 156. This is apparently the Datte d'Hongrie still growing under that name in the collection of Ellwanger & Barry, and is probably the plum really entitled to the name. It is the one described and illustrated here.

2. The variety commonly called Hungarian prune on the Pacific coast is Pond.

3. The Date plum, or Quetsche de Hongrie, described by Downing (ed. 1881, p. 908), the description being taken from the Pomological magazine. This cannot now be identified, but is certainly a very different variety.

4. The Hungarian grown by the Michigan experiment station and described in their publications (Bulletin 169:245), from which the following description is arranged: Fruit round; size medium to large; cavity medium; stem half an inch long; suture slight; apex often slightly depressed; color dark blue or black; bloom blue; flesh yellowish, firm; stone round, not flattened, free; flavor mild and pleasant; quality good; season medium; tree vigorous, productive.

This last plum came to the Michigan station from Professor Budd, and is probably his Ungarish. In a bulletin of the Iowa agricultural college, dated January, 1886, Budd notes this variety as coming from C. H. Wagner, Riga, Russia. In

the same bulletin he notes another plum as coming from Wilhelm Wohler, Wilna, Russia, under the name of Quetsche de Hongrie, and suggests the name Hungary for this also. Possibly these two are distinct. Possibly the first is the same as

HUNGARIAN

the variety noted by Gibb in the report of the American pomological society for 1887 as Quetsche de Hongrie, or Zwetsche Ungarische, and for which the name Hungary is suggested.

Ickworth (Ickworth Imperatrice).—Fruit obovate; size medium or large; stem medium; color purple, marked with

yellowish tracings; flesh greenish-yellow; stone small, cling; quality good; season late.

Origin, England.

Imperial Gage.—Fruit round-oval; size medium; cavity shallow, broad, flaring; stem an inch long, pubescent; suture shallow; color yellowish-green; dots green; bloom whitish; skin tough; flesh greenish-yellow stone round-oval, only

ITALIAN PRUNE

slightly flattened, rough, nearly or quite free; quality good to best; season medium.

Originated many years ago at Prince's nurseries, Flushing, Long Island. It has enjoyed a considerable popularity. Downing tells of a single tree near Boston which had "produced fruit, to the value of nearly fifty dollars annually." It seems to be waning in favor, however.

Italian Prune (Fellenberg).—Fruit elliptical, straighter on one side and longer on the other; size medium to large; cavity very shallow; stem nearly as long as the fruit; suture

shallow; color dark blue; dots not many, dull yellow; bloom blue; skin thin; flesh greenish-yellow; stone medium size, oval, pointed, rough, ridged at the edge, quite free; quality good to extra; season late; tree rather spreading.

An old European variety. One of the most widely grown plums in America. A prime favorite market plum in New York and Michigan and on the Pacific slope. Desirable on account of its lateness and good shipping quality.

JAUNE HATIVE.—Fruit oval or obovate; size small; cavity shallow; stem one-half inch long, slender; suture shallow; color yellowish; bloom thin, white; flesh yellow; stone free; flavor pleasant; quality good; season very early.

A very old European sort.

JEFFERSON.—Fruit round or round-oval; size medium to large; cavity very shallow; stem medium short; suture hardly any; apex very slightly depressed; color greenish-yellow; dots many, greenish; bloom white; skin thin and tender; flesh yellow; stone medium size, blunt, with a short neck, slightly flattened, rough, free; flavor rich and sugary; quality good to best; season medium late; a good tree.

JEFFERSON

Originated with Judge Buel, New York. Said by Downing to be "the most desirable and beautiful of all dessert plums." Certainly a fine variety for the amateur, and not planted so often as it deserves. Not a good market variety.

KINGSTON.—Fruit oval; size medium large; cavity medium deep, abruptly rounded; stem medium long; suture shallow; apex slightly pointed; color blue; dots minute and inconspicuous; bloom blue; skin thin; flesh greenish-yellow; stone medium size, oval, with a short neck, hardly flattened, rough, cling; quality fair to good; season medium to late.

Origin, Ontario(?).

LAFAYETTE.—A large, purple, late variety of which I have not been able to secure notes.

LAWRENCE (Lawrence's Favorite).—Fruit round or somewhat oval; size medium to large; cavity shallow, very abrupt;

stem short; suture faint; color dull green, yellowing slightly in the sun; dots many, small, whitish; bloom white; skin thin; flesh greenish-yellow; stone medium size, oval, hardly flattened, cling; flavor rich and sweet; quality extra; season medium early; tree large and vigorous.

Seedling of Green Gage grown by L. U. Lawrence, Hudson, New York. A fine dessert plum and deserving greater popularity.

KINGSTON

LEIPSIC.—Fruit oval; size medium to large; cavity medium deep, rounded; stem medium; suture a line; apex very slightly depressed; color dull red; dots many, white; bloom blue; skin firm; flesh yellow, meaty; stone medium size, oval, flattened, cling; flavor sweet and rich; quality good.

A Russian variety of the Lombard type imported by Professor Budd. Craig says, "this appears to be identical with Merunka."

LEWIS.—Fruit roundish oval; size large; cavity medium deep, abrupt; stem short; suture shallow; color red, a little darker than Lombard; dots numerous; bloom thin, pale

bluish; skin medium thick; flesh pale yellow; stone large, oval, free; quality good to very good; season late.

Received by United States Department of Agriculture from H. C. Cook, White Salmon, Washington.

LINCOLN.—Fruit oval; size large; cavity very shallow; stem medium long; suture very shallow; color dull, mottled red, on a yellow ground; bloom delicate, lilac; flesh greenish-yellow.

LOMBARD

This plum, though not a novelty, has recently been boomed by certain nurserymen. Its history and merits are unknown to the writer.

LOMBARD.—Fruit oval, slightly flattened at the ends; size medium, or sometimes large with good cultivation; cavity medium deep, abruptly rounded; stem very short, slender; suture shallow; color delicate purplish or reddish violet; dots several, whitish; bloom blue; skin thin; flesh yellow, firm;

stone medium size, oval, flattened, cling; quality fair; season early; tree strong, healthy, upright grower.

Said to have been grown from seed by Judge Platt of Whitesboro, New York. Named by the Massachusetts Horticultural society after Mr. Lombard of Springfield, Massachusetts, who introduced it in that state. This is one of the most extensively planted plums in the northeastern states, and has been found very profitable by some growers. It occupies among Domestica plums somewhat the same place which the Ben Davis holds among apples, including adaptability to all soils, thrift under neglect, good bearing and mediocre quality. The tree is excellent for top-grafting, and is not seldom planted for this purpose. Along with Lombard, Craig describes Spanish King, believing it to be practically the same thing.

Longworth.—"A medium-sized oval fruit; color reddish-purple; flesh amber yellow, breaking-sweet, pleasant; quality good; resembles Lombard, except that it has a freestone; season first half of September in northern Michigan."—United States Pomological Report, 1891, p. 392.

Lyon (Bailey).—"Trees upright, spreading, quite vigorous; young wood of a reddish-brown; fruit round or slightly oval; stalk one inch long, moderately stout; cavity narrow, slight; apex depressed; suture slight, one-half around; color bright clear yellow, with a slight bloom; flesh moderately juicy, yellow, tender, rich, sweet, vinous; pit large, oval, plump, nearly free; quality, quite good; season September 1; size large; generally quite productive. A promising variety brought to notice by S. S. Bailey of Grand Rapids, Michigan, and renamed by the Michigan Horticultural society."—Michigan Experiment Station Bulletin, 169:244 (1899).

Merunka.—Fruit truncate, oval; size medium; cavity medium deep, abruptly rounded; stem strong; suture faint; apex depressed; color dark dull red; dots many, white; bloom blue; skin thin; flesh yellow; stone large, oval, pointed, flattened, rough, cling; quality fair to good.

A Russian plum of the Lombard type imported by Professor Budd. Said to average larger than Lombard in Iowa, and to be of better quality.

McLaughlin.—Fruit round or even oblate; size medium; cavity shallow, with a ridge around the stem; stem strong, rather long; suture very shallow; apex very slightly depressed; color greenish-yellow, with a pink blush; dots many, greenish; bloom white; skin thin; flesh yellow; stone medium size, oblique-oval, slightly flattened, rough, cling; flavor rich, sugary; quality extra; season medium; tree hardy and a fairly good grower.

Originated with James McLaughlin, Bangor, Maine.

Probably a seedling of Green Gage, to which type it is readily referred. A fine amateur variety and profitable in some markets, where it does not have to be shipped too far.

MIDDLEBURG.—"Tree quite vigorous, upright, with rather spreading branches; fruit roundish-oval; stalk one to one and one-half inches long, stout; cavity broad, slight; apex indistinct; suture unmarked; color greenish-yellow, nearly covered with reddish-brown and with a purplish color on the exposed side; bloom thin, light blue; flesh moderately juicy, light amber, rather firm, vinous, sprightly, rich; pit small, nearly round, free; quality very good; season September 18; size medium; fairly productive." — Description taken from Michigan Experiment Station Bulletin 169:244 (1899).

MILLS.—Fruit oval; size medium; cavity shallow, abrupt; stem short, suture faint; color purplish-red; dots conspicuous, whitish; bloom blue; skin thin; flesh greenish; stone oval, slightly flattened, free; quality fair; season medium to late.

Known to me only as I have seen it fruiting on the grounds of Ellwanger & Barry, Rochester, New York.

McLAUGHLIN

MOLDAVKA. — Fruit long, ovate; cavity deep, abrupt; stem stout, an inch long; suture shallow; color pale yellow; bloom thin; flesh yellowish; stone long, ovate, pointed, flattened, free; flavor mild; quality good; season medium; tree moderately vigorous, spreading upright, not productive.

Of Russian origin.

MONARCH.—Fruit roundish, oval; size large; cavity deep, broad, rounded; stem short and stout; suture hardly visible; color dark purplish; bloom heavy, bluish; flesh yellowish; stone free; quality good; season late.

An English variety lately introduced to this country and thought to be a valuable late shipping plum.

MONROE (Monroe Egg, Monroe Gage).—Fruit round oval; size small to medium; cavity shallow; stem short (some descriptions say long); suture faint; color creamy yellow; dots white; bloom white; skin tough, thin; flesh yellow;

stone small, oval, slightly flattened, free; quality good to best; season medium.

Originated with Miss Dunham, Penfield, Monroe county, New York.

Murdy.—"Tree strong-growing, upright; fruit roundish-oval; stalk three-fourths inch long, stout; cavity narrow, rather deep; apex imperceptible; suture slight, one-half around; color reddish-purple, with many yellowish dots and specks and a light blue bloom; flesh moderately juicy, amber, tender, sweet, vinous, rich; pit oval, pointed, moderately plump, cling; quality very good; season September 16; size large; as yet rather unproductive, but if this quality develops, it bids fair to become a valuable market sort."—Michigan Experiment Station Bulletin 169:247 (1899).

Naples (Beauty of Naples).—Known to me only from the nursery catalog description, according to which it is "a dessert plum of the highest quality, medium size, greenish-yellow, somewhat striped, very sweet, hardy, strong grower."

Nonsuch (Lucombe's Nonsuch).—Fruit roundish-oval; size, medium or larger; cavity shallow and wide; suture indistinct or wanting; color greenish, turning yellow; bloom white; flesh greenish-yellow; stone cling; quality good; season late.

An English variety of the Green Gage type.

Orleans (Smith's Orleans, Red Magnum Bonum).—"Fruit large to very large, oval, rather widest toward the stalk, a little irregular, with a strongly marked suture on the side; stalk quite small and slender, little more than half an inch long, inserted in a deep, narrow cavity; skin reddish-purple; covered with a deep blue bloom; flesh deep yellow, a little firm, very juicy, with a brisk, rich, vinous flavor (not sweet and cloying), and adheres to the stone; good to very good; 20th to the last of August; growth very vigorous."—Description adapted from Downing.

Oullin (Oullin's Green Gage, etc.).—Fruit round or round oval; size medium; cavity shallow, abrupt; stem rather long; suture faint; color dull green, becoming yellowish; dots faint, whitish; bloom white; skin thin; flesh yellowish; stone medium size, oval, slightly flattened, cling; quality only fair to good, as I have seen it, though rated very good by Downing; season medium early.

A German variety of the Green Gage type.

Pacific.—Fruit oblong; size very large; cavity shallow, flaring; stem, short, stout; suture shallow, but distinct; apex slightly depressed; color dark crimson; dots many, yellow; bloom heavy, bluish; skin thick, tough; flesh yellowish;

stone medium size, oval, nearly free; quality good; season medium late.

Originated at Mt. Tabor, Oregon, with Sluman & Nunn.

PAQUET.—Fruit oval; size very large; cavity large; stem about an inch long; suture moderate; apex truncated; color yellow, washed with red; dots many, yellow; bloom bluish; skin thick; flesh yellow; stone oval, semi-cling; quality very good; season early.

Originated in 1889 with Peter Paquet, Oregon City, Oregon.

PEACH.—Fruit shaped like a peach; size very large; cavity shallow, narrow; stem short, stout; suture shallow; apex depressed; color light brownish-red; dots dark colored; bloom pale; flesh pale yellow; stone free; flavor sprightly and pleasant; quality good; season early. Description adapted from Downing.

This is undoubtedly the Prune Peche, long known in France and neighboring countries. It is mentioned in all the older works on American pomology, but does not seem to be grown at present.

PEARL.—A seedling of Agen originated by Luther Burbank; described as larger than the parent, ovoid, flattened, white semi-transparent, with a heavy, white bloom.

PETERS

PETERS (Peters Yellow Gage).—Fruit round-oval; size medium to large; cavity medium, shallow, abrupt; stem long, pubescent; suture shallow; apex slightly depressed; color greenish-yellow, sometimes with a slight blush; dots many, yellow; bloom white; skin thin; flesh greenish-yellow; stone medium large, oval, pointed, hardly flattened, cling; quality good to best; season early; tree moderately vigorous and upright.

A good amateur variety of the Green Gage type.

POND (Pond's Seedling, Fonthill).—Fruit obovate, with a short neck; size very large; cavity shallow, narrow, abrupt;

stem medium; color violet or purple; dots numerous, brownish; bloom purplish; skin thick; flesh yellow, juicy; quality first-rate; season medium late; tree vigorous and productive.

Of English origin. A good variety.

Pride (Shippers' Pride).—Fruit nearly round; size large; color, dark purple or blue; quality said to be good; season medium late; a good canning and shipping plum.

Purple Favorite.—Fruit roundish-obovate; size medium to large; cavity very shallow; stem slender; suture none; color light brown in the shade, purple in the sun; dots numerous, golden; bloom light, blue; flesh pale greenish, juicy, tender; stone small, roundish, free; flavor sweet; quality good to best; season early. Description adapted from Downing.

POND

This variety originated on the Downing homestead at Newburgh, New York, with the father of A. J. Downing. It is not now widely grown.

Purple Gage (Reine Claude Violette). — Fruit nearly spherical; size medium; cavity shallow; stem short, stout; suture nearly obsolete; apex rounded; color blue; dots many, distinct, whitish; bloom blue; flesh greenish-yellow; stone small, oval, moderately flattened, half free; flavor very rich, sweet and sugary; quality good to best; season medium.

Of European origin and a favorite in parts of that country. Not a good market plum, but desirable for home use.

Quackenboss.—Fruit round-oval; size medium or larger; cavity shallow, flaring; stem rather long; suture a line; color blue; dots blue; bloom blue; skin thin; flesh greenish; stone oval, pointed, flattened, cling; quality fair to good; season medium; a good rapid-growing tree and fairly productive.

Originated in the garden of S. C. Groat, Albany, New York, and introduced by Mr. Quackenboss of Greenbush, New York.

Richland.—Fruit oval; size large; cavity deep, abrupt;

ROYAL TOURS

stem medium long, slender; suture a line; apex round; color blue; dots many, small, white; bloom blue; skin tender; flesh greenish-yellow; stone large, elliptical, flat, cling; quality good; season medium.

Originated on the farm of Randall Elden, Richland, Pennsylvania. Does not seem to fill a long-felt want.

Royale Hative.—Fruit roundish; size medium; cavity shallow or none; stem half an inch long; color light purple, slightly streaked with brownish; dots yellowish; bloom blue; flesh yellow; stone free; quality very good; season early.

An old French variety.

Royal Tours (Royale de Tours).—Fruit irregular, rounded, one side much larger than the other; size medium to large; cavity narrow, rather deep; stem short, stout; suture deep; apex a white dot; color deep purple over red; dots many, large, yellow; bloom thick, bluish; skin thick, firm; flesh greenish-yellow; stone rather large, oblong, hardly flattened, rough, cling; flavor rich and sugary; quality good to best; season medium.

This is an old French variety, long known and highly esteemed in Europe, but never popular in this country and now almost lost to cultivation here. During the season of 1899 (August), however, I received specimens from North Carolina, where it is grown locally under the name of Worth, and where it is highly praised. It seems to me to be a dessert plum of value, and fit to be grown alongside of some of our best Domesticas.

Saint Catherine.—A medium-sized, obovate, yellow plum, formerly regarded as an important variety for prunes in France. Described by all the early American works, but now apparently unknown in this country.

Saratoga.—Fruit round-oval; size large; cavity deep, narrow; stem an inch long; suture shallow; apex slightly depressed; color dull, dark purplish; dots many, minute, whitish; bloom thin, bluish; flesh dull yellow; stone oval, pointed, cling; flavor mild sub-acid; quality good; season early; tree vigorous, upright.

Sergeant (Robe de Sergeant).—Downing gives this name as a synonym of Prune d'Agen, but the variety now grown on the Pacific coast as Robe de Sergeant is said to be altogether different. It is thus described by the California horticulturist, John Rock: "Fruit medium size, oval; skin deep purple, approaching black, and covered with a thick blue bloom; flesh greenish-yellow, sweet and well-flavored, sugary, rich and delicious, slightly adhering to the stone." Wickson says: "This

variety makes a larger, darker-colored dried prune than the Prune d'Agen, and has sold in some cases at a higher price."

Origin, Europe(?).

SHARP (Victoria, Sharp's Emperor).—Fruit oval; size large to very large; cavity medium deep, abrupt; stem nearly an inch long, pubescent; suture shallow; color light pinkish-red, coloring late; dots whitish and pinkish; bloom bluish; skin thin; flesh yellow; stone medium size, round-oval, blunt, ridged, considerably flattened, free; flavor rich; quality good to very good; season medium; leaves large, ovate, pubescent.

An English variety, long known in this country, but never attaining a general popularity, though it has much to recommend it to the amateur grower.

There has been a good deal of confusion as between the names Victoria and Sharp. This matter has been recently investigated with the help of Mr. W. A. Taylor of the United States division of pomology, and the result seems to be that these two are synonyms, and that the name Sharp ought to be used as recommended by the American Pomological society. The name Victoria is very commonly used, however.

SPANISH.—"Trees quite vigorous, rather upright; fruit medium to large, roundish, slightly inclined to oval; cavity narrow, deep; stalk stout, five-eighths inch long; apex and suture hardly mar[1]ed; color reddish-purple, with a bluish bloom; flesh firm and juicy, light amber, with a mild, vinous, nearly sweet flavor; pit medium size, oval, cling; quality fair; quite productive; season August 25; young wood reddish-brown. Although rather small, it may have some value as a market sort."—Michigan Experiment Station Bulletin 169:248 (1899).

SPAULDING.—Fruit oval; size medium to large; cavity shallow; stem medium; suture distinct; color yellowish-green; bloom whitish; flesh tender, juicy, yellowish; flavor sweet and pleasant; quality good; season medium.

STANTON.—Known to me only through Michigan Experiment Station Bulletin 103:35, from which the following note is taken: "Tree a good grower; fruit medium to large, round-oval, deep purple, with a thick bluish bloom; quite productive; last of September and early October. An excellent keeper and a promising late sort for canning purposes."

ST. JULIEN.—A somewhat striking but inferior type, partaking partly of the character of the Myrobalan and partly of the character of the Damson. Used for stocks. It has been tried for this purpose in this country and discarded.

ST. LAWRENCE.—Fruit round-oval; size very irregular, medium; cavity deep, evenly rounded; stem short, pubescent;

SHARP

suture shallow; color dark blue; dots several, faint; bloom blue; flesh yellow; stone small, round, pointed, turgid, cling; quality poor; season medium early.

A seedling of Orleans grown by Ellwanger & Barry, Rochester, New York.

Sugar.—A new drying prune originated by Luther Burbank and introduced by him in 1899. It is described as follows by Secretary B. M. Lelong of the California state board of horticulture: "An extremely early prune, ripening first of August; skin, very tender, at first of a light purple, tinted with green, changing at maturity to dark purple, covered with a thick white bloom; flesh yellow, tender and rich; form ovoid, slightly flattened, large; average size fifteen to the pound, which is two or three times larger than French prune (Agen): fruit stalk short, separates from the fruit easily as the fruit reaches maturity; stone medium size, flattened, slightly wrinkled and most often separated from the flesh."

Regarded by Mr. Burbank as one of his best creations, and spoken of as highly promising by Professor Wickson and others.

Tatge.—A variety of the Lombard type, and by some thought to be identical with that variety. Originated at Belle Plain, Iowa, and much advertised in the west recently.

Tennant.—Originated in Whatcom county, Washington, and said to be an acquisition. Large, dark purple, with a blue bloom.

Tragedy.—Fruit egg-shaped; size medium to large; cavity medium shallow; stem short, stiff; suture deep; color dark blue; dots very minute; bloom blue; skin thick and tough; flesh firm, yellow, meaty; stone large, pointed, flattened, cling; flavor brisk; quality, good; season early.

Origin, California. Thought by some to be a valuable early shipping plum, but has not yet been sufficiently tested in the eastern states.

Transparent (Transparent Gage).—Fruit roundish, oblate; size medium or larger; cavity small but deep; stem medium; suture shallow, distinct; apex depressed; color greenish-yellow, marked with red in the sun; bloom whitish; flesh greenish-yellow, tender; quality good to best; season medium.

A French variety, thought to be a seedling of Green Gage, and evidently referable to that type.

Union (Union Purple).—This variety is unknown to me except for the description given in the catalog of S. D. Willard, which is as follows: "Fruit large, roundish-oval; skin reddish purple, covered with a thin bloom; stalk short

and stout; flesh greenish, vinous, sweet, adheres to the stone; tree vigorous; season September (in New York)."

WALES (Prince of Wales).—Fruit globular or oblong; size large; cavity moderate; stem short and stout; suture medium; color reddish-purple; dots brownish-yellow; bloom heavy; flesh greenish-yellow; stone partly free; quality good; season medium early.

Origin, England.

WANGENHEIM.—Fruit ovate; size medium; cavity shallow; stem slender, short; suture shallow or wanting; color dark blue; bloom heavy, blue; flesh hard, yellow; stone small, oval, free; flavor sweet; quality fair; season medium early; tree moderately vigorous, branches somewhat spreading.

Of German extraction; known in this country for many years, but of no special value.

WASHINGTON

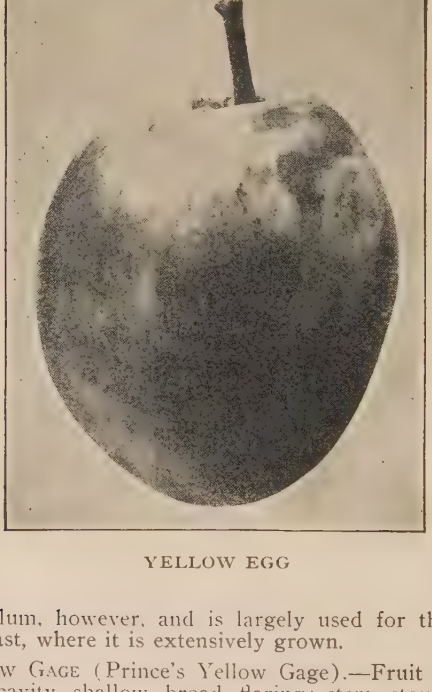
WASHINGTON (Bolmer).—Fruit nearly round; size medium to large; cavity shallow, flaring; stem short, pubescent; suture shallow; color greenish-yellow, with a pink blush in the sun; dots several, greenish; bloom white; flesh yellow; stone medium size, round-oval, but little flattened, rough, free; quality good to extra; season medium early; tree a strong grower, with large, broad, glossy foliage.

Downing gives the following interesting account of the origin of this variety: "The parent tree grew originally on Delancey's farm, on the east side of the Bowery, New York, but, being grafted with another sort, escaped notice until a *sucker* from it, planted by Mr. Bolmer, a merchant in Chatham street, came into bearing about the year 1818, and attracted universal attention by the remarkable beauty and size of the fruit. In 1821 this sort was first sent to the horticultural society of London by the late Dr. Hosack."

YELLOW EGG (Magnum Bonum, Dame Aubert).—Fruit in shape like a goose egg; size largest; cavity shallow and abrupt, surrounded by a ridge; stem nearly an inch long; suture usually shallow; color creamy yellow when ripe; dots

many, greenish, indistinct; bloom white; flesh yellow; quality fair to good; season medium; tree tall and vigorous, but rather straggling.

A very old European variety, cultivated in this country from the earliest times. Is planted oftener than its merits justify, probably on account of its great size. It is a good



YELLOW EGG

canning plum, however, and is largely used for this on the Pacific coast, where it is extensively grown.

Yellow Gage (Prince's Yellow Gage).—Fruit oval; size medium; cavity shallow, broad, flaring; stem stout, medium long; suture a line; apex rounded; color golden yellow, a little clouded; bloom white, heavy; flesh deep yellow; stone free; flavor, rich sugary; quality very good; season early.

XVIII

The Damson Plums Named and Described

CLUSTER.—Under the name of Cluster Damson, several New York growers have a fine, prolific, round, rather small plum of this class, the history of which I do not know. The variety seems to be an excellent one for commercial purposes.

DANISH DAMSON.—Craig (Iowa experiment station) gives the following notes: "Fruit, round, three-fourths to seven-eighths of an inch in diameter, beautiful light blue; best quality for canning, and very good to eat out of hand; colors four weeks before ripe; freestone; season first or second week in September; tree upright grower, hardy, hardiest of Domesticas here tested; bears young and regularly; seems as hardy in bud as Americanas. (H. Knudson, Springfield, Minnesota.)

"Scions were imported from Denmark in the spring of 1884 by H. Knudson and introduced by him a few years later."

EUGEN FURST.—Fruit pear-shaped, with a curious little neck; size small; cavity shallow, abrupt; stem slender; suture obsolete; apex slightly pointed; color blue; dots none; bloom thick, blue; skin tough; flesh greenish yellow; stone

CLUSTER DAMSON

small, obliquely rounded, hardly flattened, short-pointed, nearly free; quality fair to good; foliage of a Damson.

A German variety introduced to America about sixty years ago.

FREESTONE (Freestone Damson).—Fruit oval; size small; cavity very shallow; stem short, stout; suture none; color dark blue, dots none; bloom blue, skin tough, astringent;

EUGEN FURST

flesh greenish, stone small, oval, pointed, turgid, free; quality fair for a Damson.

Of no particular value.

FRENCH.—Fruit roundish-oval; cavity shallow; stem one-half inch long; suture almost obsolete; color very dark blue; dots numerous, gray; bloom blue, flesh dull green; stone small, round, flattened, cling; quality good; season late; tree

vigorous, with dense, roundish head; said by some to be lacking in productiveness.

Mr. S. D. Willard says of this variety: "It has much to commend it. Tree a much better grower than the Shropshire; hardy, and an annual bearer; very productive."

FROGMORE.—Fruit oval; size small; cavity shallow; stem long, slender; suture a line; color blue; dots very small, hardly visible; bloom blue; skin tough; flesh greenish; stone

SHROPSHIRE

small, oval, somewhat flattened, cling; quality good for a Damson.

One of the best of the Damsons.

SHROPSHIRE (Shropshire Damson).—Fruit oval; size small; cavity hardly any; stem about one-half inch long; suture none; color dark blue; dots none visible; bloom blue; skin firm; flesh greenish; stone small, oval, turgid, cling; flavor sour; quality fair; tree a good grower and enormously productive.

An English variety, and one of the favorite Damsons.

STONELESS.—Fruit oval, compressed; size small, much like a Damson; cavity hardly visible; stem large and strong;

suture indistinct; apex a dot; color deep blue; dots hardly to be seen; bloom thick, bluish; skin firm; flesh green, firm; stone none, the seed lying naked in the flesh; quality fair.

This is an old curiosity which has been known for more than a century in France. The foregoing description is from specimens grown by Luther Burbank. It has no practical value.

White Damson.—Fruit oval; size medium; cavity very shallow; suture none; color yellowish, like a ripe Bavay; dots fine, darker colored; bloom white; flesh greenish; stone cling; quality good, season late.

This plum is really not white, but has the color of the Green Gage type. The foliage, however, seems to be of the Damson sort.

XIX

The Japanese Plums Named and Described

ABUNDANCE (Botan).—Fruit irregular ovoid; size medium to large; cavity abruptly rounded; stem medium short, strong; suture shallow; apex usually distinctly pointed; color bright red, almost entirely overlaying a yellow ground; dots many, large, oval, flattened, cling; flavor sweet and rich; quality good to very good; season early; tree a strong, thrifty, upright grower, hardy, an early and prolific bearer.

Imported from Japan by Luther Burbank in 1884, and first sent out as Botan. Renamed Abundance and generally distributed by J. T. Lovett in 1888. One of the best known and deservedly popular of the Japanese plums.

As with all the principal varieties of the Japanese plums, there are several different things passing as Abundance. The description given above is by the author, from specimens true to type. The commonest of the spurious types is the smaller sort which Bailey formerly called Babcock, but which he latterly brings back to the name of Abundance. In his most recent publication, Professor Bailey also refers Chase and Douglas to Abundance and makes them synonyms of this

variety. Persons buying trees of Abundance should take great pains to get them true to type.

Babcock.—A small and inferior type of Abundance. First described under the name Babcock by Bailey (Cornell Bulletin 62:19) but more recently referred by him to Abundance (Cornell Bulletin 175:142). The true Abundance should always be planted in preference to this variety.

Berckmans (True Sweet Botan, White-fleshed Botan).—"Fruit of medium size, round-oblong, with a tendency to have a blunt point, more or less angular in cross-section, the suture not prominent; color deep bright red, especially when exposed to the sun, more or less yellow-splashed on the shaded side; flesh firm and sweet, cling or semi-cling, becoming dry and insipid when fully ripe. Ripe this year on the 4th to 6th of August with the earliest trees of Abundance. In 1896, it also ripened with Abundance or just ahead of it. In 1897, the same trees ripened two weeks later than Abundance. It is an upright grower, with yellowish-green, rather small foliage. It is readily distinguished from all other Japanese plums which I know by the dry and mealy character of the ripe fruit.

"We doubt if the Berckmans is of sufficiently high quality to recommend it for general planting, since the Abundance occupies the same season. Some of the trees which have passed for Berckmans are Abundance. The true Berckmans is distinguished by its dry flesh."—Bailey, Cornell Bulletin 175:138, 1899.

Berger (Strawberry, Ura-Beni, Uchi-Beni).—"Small and cherry-like, flattened endwise, with a distinct suture; color bright light red, with prominent bloom; flesh firm and meaty, yellow, free from the very small pit and with no astringency or almond flavor, the skin not tough nor sour; ripe this year on the 17th and 18th of July. This is one of the most distinct of all the Japanese plums. It has the flavor of some of the Domestica varieties. The handsome little fruits fall when ripe and should be caught on straw or hay spread underneath the tree. The plums are not much larger than very large cherries, and coming after the sweet cherries are gone, they seem to piece out the cherry season. The tree is a distinct and upright grower, with rather narrow and light colored leaves, and the fruits are borne well down on the older wood. We believe that the Berger is well worth growing in every home garden."—Bailey, Cornell Bulletin 175:132, 1899.

Biery.—Fruit globular; size medium; cavity deep, abrupt, narrow; stem short; suture a trace; color yellow blushed with red, patched with russet; dots minute, russet; skin thin, separates easily from the flesh; flesh yellow, tender,

very juicy; stone medium size, oval, cling; quality good; season a week to ten days after Abundance.

Grown by J. J. Biery, Covington, Louisiana, who received it from California as Longfruit. Notes taken from United States pomologist report, 1895, p. 45.

Botan.—There have been several varieties under this name introduced into the American trade. Nearly all have now been renamed. The most important are Abundance and Berckmans. Botan is not a variety name, but a Japanese class name, something like Gage, Damson or Prune. In a general way it appears to stand for a large, round, latish plum, but the application has been very careless, even in Japan, and has been infinitely confused in the introductions to this country.

Burbank.—Fruit roundish, conical; size large to very large; cavity rather deep and abrupt; suture shallow or absent; apex somewhat pointed; color bright, dark, metallic red on a yellow ground; dots numerous, small; skin medium; flesh yellow, juicy, firm; stone, medium size, roundish, pointed, cling; flavor rich and sugary; quality good to very good; season medium; tree a very strong, spreading, wayward grower and requires severe cutting back to keep it within bounds; an early and profuse bearer, requiring heavy thinning to secure fruit of reasonable size.

Imported from Japan in 1885 by Luther Burbank. Introduced to the trade generally in 1890. This is one of the best and most popular Japanese plums. Its early and heavy bearing, its freedom from insects and disease, and its large size and attractive color make it a desirable market fruit. It has been found successful in many parts of New England, New York and the central states. It does not appear to do so well southward, where it rots badly, and is held in very low esteem by some southern plum growers.

Chabot (Bailey Yellow Japan, Furugiya, etc).—Fruit strongly heart-shaped; size large; cavity abrupt, rather large; stem short, very stout; suture faint; apex rounded or pointed; color, dull red on a greenish-yellow ground; dots, many, yellowish; bloom blue; skin strong; flesh firm, yellow, juicy; stone medium size, oval, pointed, hardly flattened, cling; flavor sweet and rich; quality good or better; season late; tree a strong, upright grower and a good bearer; probably the best Japanese plum of its season.

Imported from Japan by Mr. Chabot of Berkeley, California, but introduced to the trade by Luther Burbank in 1886.

Delaware.—Fruit ellipsoid; size medium to large; cavity shallow, rounded; stem medium; suture a faint line; apex rounded; color deep, dark, dull red; dots many, dull yellow; bloom whitish; skin medium; flesh rather soft, light yellow

inside, red outside; stone large, oval, somewhat flattened, roughened, cling; quality fair.

Originated by Luther Burbank from seed of Satsuma, crossed by Kelsey. First offered in 1893. Introduced later in the east by J. L. Childs. Has not been accorded much notice, whether from lack of merit or of advertising, I am unable to say.

Douglas (Munson).—Fruit round oblong; size medium to large; cavity shallow; stem short, stout; suture shallow; apex somewhat rounded; color dark, purplish red; dots many, small; bloom bluish; flesh yellow, firm; stone nearly free; quality good; season about with Abundance.

CHABOT

Imported and introduced by J. T. Whitaker, Texas. Bailey first named this Munson; he afterward renamed it Douglas; and in his latest publication he says it is the same as Abundance. The inappetent plum man may take his choice.

Earliest of All (Yosebe Wasse-Sumomo). — Fruit round; size small; cavity shallow, narrow; stem rather long and slender; suture only a line; color pinkish-red; dots many, minute; bloom light, whitish; skin thick, tough; flesh soft, yellow; stone small, round, cling; quality fair; season earliest of the Japanese.

Like many other Japanese plums this is greatly confused. The original stock was probably imported by H. H. Berger & Co. of California. It has no value aside from its earliness. Stark Brothers' name, Earliest of All, is used here, following Bailey, though it is objectionable in form.

ENGRE.—"About one-third larger than Earliest of All, not round, but somewhat flattened endwise, the suture usually rather prominent; color a very little darker than Earliest of All; flesh soft and yellow, cling, sour, but with almost no almond flavor, and the skin tough. Engre is practically of the same season as Earliest of All, although this year it was about one day later. It is a distinctly better plum. We recommend it for being very early. With us it has been a prolific bearer, and the fruits are attractive. Its quality is not as good as that of Burbank and Abundance, but its great earliness commends it."—Bailey, Cornell Experiment Station Bulletin 175:131, 1899.

GEORGESON (Hattonkin, Mikado, White Kelsey, Yeddo).—Fruit globular or somewhat heart-shaped; size medium to large; cavity deep, abrupt; stem medium; suture faint; apex rounded or pointed; color rich yellow; bloom whitish; skin tough, sour; flesh firm, hard, yellow; stone medium large, cling; quality fair; season late.

Imported by H. H. Berger of San Francisco. Distributed under various labels. Not a favorite.

HALE (Prolific, of Burbank).—"Fruit medium to large, globular or somewhat globular-oblong, not pointed, the suture usually distinctly marked; color deep yellow or orange, thinly overlaid with mottled and speckled red, giving the appearance of a yellow-red fruit, bearing a thin bloom and having many yellow specks; flesh soft and juicy, yellow, cling, of good quality, but the skin sour; ripened with us this year on the 24th of August. The fruit has a very slender stem and drops easily from the tree. The tree is a moderately spreading grower, being intermediate in habit between the Georgeson and Abundance. The fruit is of good quality, but for the last two seasons it has failed to color well and has dropped prematurely. The trees have not been very productive, although they have borne for three consecutive years. From its behavior thus far, we are of the opinion that the Hale should not be put in the first or leading list of Japanese plums for western New York. It follows the Georgeson, being in condition for eating when the last specimens of the Georgeson are passing."—Bailey, Cornell Bulletin 175:147, 1899.

Imported by Luther Burbank in 1885. Named for the introducer, J. H. Hale, of Connecticut. Has been rather largely planted in the last four or five years, but is not yet sufficiently tested in the orchard.

HATTANKIO.—Variously written Hattan, Hattankio, Hytankio, Hattonkin, Hytan-Kayo, etc. This is another Japanese class name, seeming to refer to the pointed varieties, but much confused, especially in this country. It should not be applied to any one variety.

HEIKES.—"Much like Hale, but rather more flattened at the ends, or oblate, mostly darker in color, the flesh acid.

"Named for W. F. Heikes, Huntsville, Alabama."—Bailey, Cornell Experiment Station Bulletin 62.

HUNN.—"Fruit small to medium, globular, sometimes with a distinct short point, the suture more or less prominent; color something like that of Abundance, but less pink, and usually a deep claret red, with many minute, golden dots; flesh soft, deep yellow, cling, of fair to good quality, aromatic. Ripened this year as the Georgeson was passing out, that is, from the 20th to the 24th of August. In 1897 it ripened also at this season, but since the Red June ripened with us very late that year, we compared it in season with that variety, and therefore called it an early plum. We should now call it a midseason to late plum. It has a slight musky flavor, but usually not sufficiently pronounced to make it disagreeable. We are more favorably impressed with it this year than we have been in the last two years. It is possible that it may deserve a place in the Japanese plums of second importance."—Bailey, Cornell Bulletin 175:147, 1899.

Named for C. E. Hunn of the horticultural department, Cornell university.

KELSEY.—Fruit heart-shaped, the halves unequal; size large to very large; cavity deep, narrow; stem rather slender; suture shallow; apex pointed; color rich creamy yellow, sometimes with a faint blush; bloom white; flesh light yellow, firm, meaty; stone in a large open cavity, small, oval, flattened, semi-cling; quality good; season irregular, but rather late; tree not hardy north of Washington, succeeding only in the southern states, where it has some value.

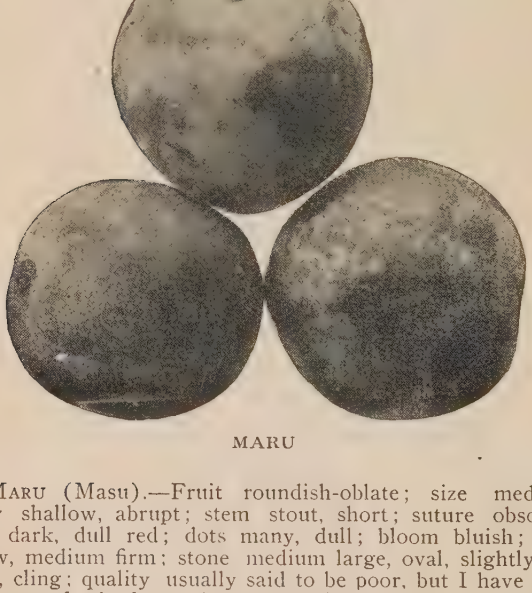
The first Japanese plum introduced to this country. It was imported with several others by Mr. Hough of Vacaville, California, through Mr. Bridges, a United States consul in Japan. The trees were turned over later to the late John Kelsey of Berkeley, California, and the Kelsey plum began to be propagated extensively about 1883. It is an attractive plum and sells well on the fruit stands.

KERR.—Fruit heart-shaped; size medium; cavity deep, rounded; stem short; suture shallow; apex pointed; color clear yellow; dots many, but hardly visible; bloom white; skin thick; flesh yellow, moderately firm; stone medium size, oval, scarcely flattened, cling; quality fair to good; season

early; tree a thrifty, strong, upright grower, somewhat resembling Chabot.

Imported from Japan by Frost & Burgess, Riverside, California, and named for J. W. Kerr, Denton, Maryland. One of the best yellow plums; also one of the best early Japanese varieties.

Longfruit.—A small, round, red, early fruit imported by Luther Burbank in 1885. Little known. The tree is upright and thrifty in habit, but not very productive, which coupled with small size of fruit renders it undesirable as a variety.



MARU

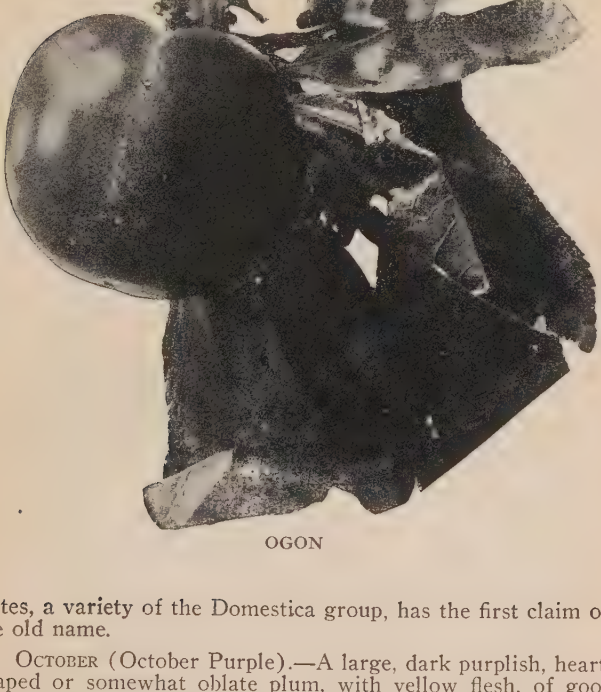
Maru (Masu).—Fruit roundish-oblate; size medium; cavity shallow, abrupt; stem stout, short; suture obsolete; color dark, dull red; dots many, dull; bloom bluish; flesh yellow, medium firm; stone medium large, oval, slightly flattened, cling; quality usually said to be poor, but I have eaten specimens fresh from the tree which were fully equal to Abundance or Burbank. It loses flavor quickly when picked, however, and does not ship well. Tree a spreading, vase-shaped grower and a good bearer.

Imported by Burbank in 1885 and introduced by him, but afterward discarded on account of poor quality.

Marketman (Shipper, of Burbank).—"Remarkable for its firm flesh and superior shipping qualities. Fruit oval, light

red, with a white bloom; firm and sweet and yet juicy. The tree is sturdy, handsome, upright but moderate grower, and requires very little attention. The fruit can be handled like apples and will keep a long time. Seedling of Satsuma."—Luther Burbank, New Creations, 1893:18.

The name is here changed from Shipper to Marketman, since the well-known Shipper or Shippers' Pride of the eastern



OGON

states, a variety of the Domestica group, has the first claim on the old name.

October (October Purple).—A large, dark purplish, heart-shaped or somewhat oblate plum, with yellow flesh, of good quality, clingstone, very late. Originated by Luther Burbank and introduced in 1897 and 1898 by Stephen Hoyt's Sons.

Ogon.—Fruit irregularly globular; size medium; cavity evenly rounded, medium deep; suture shallow; color even yellow; dots moderately numerous; bloom whitish; skin medium thick; flesh firm, meaty, yellow; stone medium large,

round, turgid, almost free; flavor flat; quality below medium; season medium early; generally reputed to be a shy bearer.

Imported by H. H. Berger & Co. of California. Not generally popular, though some like it, especially for canning.

PALMER.—Grown by J. S. Breece, Fayetteville, North Carolina, but never introduced. See report of the pomologist, United States department agriculture, 1895, p. 46.

RED JUNE (Red Nagate, Shiro-Smomo).—Fruit round-conical; size medium; cavity large, deep, flaring; stem short; suture shallow; apex pointed; color dark, coppery red; bloom bluish; skin thin; flesh yellow, juicy; stone small, oval, semi-cling; quality fair to good; season early; tree a free, spreading grower, fairly prolific.

Imported by H. H. Berger & Co., San Francisco. A favorite early market variety in the northeastern states.

SATSUMA (Blood).—Fruit broad conical; size large; cavity deep and abrupt; stem short, stout; suture nearly obsolete; apex blunt pointed; color dark, brilliant red; dots many; bloom whitish or bluish; skin thick; flesh dark red, firm; stone medium size, oval, cling; flavor rather acid; quality good; season medium to medium late; tree a spreading grower, not so hardy as leading Japanese varieties, blossoms quite self-sterile, fickle in productiveness, sometimes overbearing, sometimes entirely refusing to bear.

Imported by Luther Burbank, 1886. A favorite with some, especially for home use, canning, etc. Should be planted cautiously at first.

SEA EGG.—Mentioned by Bailey (Cornell Bulletin 106) as coming from Luther Burbank. Apparently never introduced.

WASSU.—Bailey says that "the Wassu, from Normand, is indistinguishable from Burbank." The Wassu, which I have had from J. W. Kerr (and which I think came also from Normand) looked much like Kelsey! It remains to be seen whether or not there is such a variety as Wassu, and then we may discuss what it is.

WEEPING BLOOD.—One of J. L. Normand's varieties. Not known in the north. I have no reliable description at hand.

WILLARD (Botan 26).—Fruit round; size medium; cavity narrow, deep; stem short, stout; suture very faint; apex blunt; color dull red; dots many, minute, yellow; bloom whitish; flesh greenish-yellow, soft; stone medium size, free; flavor flat; quality poor; season early; tree vigorous and hardy and fairly prolific.

This variety is early and a freestone, but is so poor in quality as to be in general disrepute.

SATSUMA

XX

The Americana Plums Named and Described

DVANCE (P. G.)—Fruit oval, truncate; size large to very large; cavity shallow or none; suture a line; apex slightly depressed; color yellowish-red; dots many, conspicuous, yellow; stone large, oval, with a distinct neck, flattened, cling; quality good; season a week after De Soto.

Originated by Theodore Williams, Benson, Nebraska, and introduced by J. W. Kerr, Denton, Maryland, 1900.

ALICE.—"From seed of Van Buren. First crop in 1893. Tree a fine upright grower, with large, light red fruit of best quality."—From circular of the originator, H. A. Terry, Iowa.

ALLEN'S YELLOW.—"Medium, round, yellow and red, skin thick; cling; Kansas."—Bailey. Probably an Americana, but now lost from sight.

AMERICAN EAGLE.—Fruit oval, slightly compressed; size large; cavity shallow, abrupt; stem medium; suture a faint line; color dark crimson over yellow; dots many, dull white

or yellow; bloom thick, blue; skin thick; flesh firm, yellow; stone large, round, flat, cling; quality good; season medium.

Introduced by Osceola Nursery Co., Osceola, Missouri, 1889. One of the best varieties in this group.

APRICOT.—Fruit spherical; size large; color yellow ground, nearly covered with red; stone cling; season of Wolf.

Not generally successful.

ATKINS (Beatty).—Fruit oval, slightly compressed; size large, or very large; cavity shallow, flaring; suture a line; color bright orange with crimson blush; dots many, very minute; bloom blue; skin thick; flesh yellow; stone medium large, oval, somewhat flattened, cling; quality good to best; season medium.

A fine and promising variety, unfortunately passing under the name of Beatty. This name is sure to be confused with the Chicasaw Beaty of Texas. The variety originated with Mr. Beatty, near Atkins, Benton county, Iowa, and was first propagated and sent out by R. Royce, Shellsbury, Iowa, and latterly and more extensively by Snyder & Son of Center Point, Iowa.

BARABOO.—"Large and as firm as De Soto; better for canning, sauce or jam; early as Cheney; drops when barely ripe, but keeps well after gathering."—Goff. Season just after Cheney. Introduced in 1897 by William Toole, Wisconsin.

BEAN.—This variety was grown by H. Knudson of Springfield, Minnesota, and is mentioned by Goff. No description or definite notes are at hand.

BENDER.—Fruit oval, slightly compressed; size large; cavity shallow; suture obsolete; color dark red; dots very many, dull yellow; bloom thick, blue; skin thick, tough; flesh yellow; stone large, ovai, flat, quite free; quality good; season rather early; tree very vigorous, with very large, fine, healthy foliage; very productive.

BIXBY (same as Bicksley, Bixly, etc.?)—Fruit round oval, size large; cavity very shallow; suture a line; color dull crimson over orange; dots many, minute; bloom blue; skin thick; flesh yellow; stone large, nearly round, slightly flattened, cling; quality fair to good.

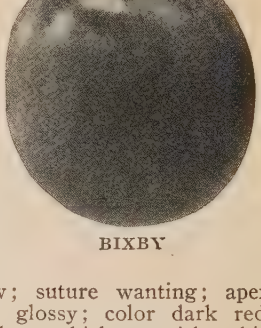
Found many years ago on the homestead of Rev. R. W. Bixby, Edgewood, Clayton county, Iowa. The description above is made from specimens received in 1899 from B. A. Mathews, Knoxville, Iowa. Other specimens under name of Bicksley from other correspondents were different. Said to be a fine variety.

BLACKHAWK.—Fruit compressed; size large to very large; suture distinct; color deep red; bloom blue; skin

thick; flesh yellow, tender; stone free; flavor rich and sweet; quality excellent; season of Wolf.

Found wild in Black Hawk county, Iowa. By some this is thought to be a good variety. Others rate it second class. As I have seen it, it is above the average.

BOMBERGER.—"Grown from seed of Harrison's Peach. First crop in 1897. Fruit large to very large, bright yellow, nearly covered with red. Shape nearly round, and of fine quality. Tree an upright, strong grower and quite productive. Ripe midseason."—From description of the originator, H. A. Terry, Iowa.



BIXBY

BRAINERD (Brainerd's Best).—A Minnesota variety mentioned by Goff, but thought not worth propagating.

BRITTLEWOOD.—"Form oval round; size large; cavity shallow; suture wanting; apex rounded; surface smooth but not glossy; color dark red, mottled; dots numerous, small; bloom thick, grayish; skin thick, slightly astringent; flesh firm, meaty; quality good; stone large, flat, partly free; flavor sharp acid. Tree large, spreading, vigorous."—Craig.

Originated by Theodore Williams, Nebraska. Said to be from Harrison Peach pollinated by Quaker. Introduced by J. W. Kerr, Maryland, 1896. A promising variety.

BRYAN (W. J. Bryan, Colonel Bryan, etc., would doubtless be changed to President Bryan if the chance offered).—"Large to very large, rich dark red, oblong, firm, a very fine market variety." So says the originator, H. A. Terry of Iowa.

BUDD (Professor Budd).—"Parentage unknown. Produced first crop of fruit in 1897. Tree a remarkably upright grower, of fine form and producing great crops of largest size and unexcelled in quality, so firm as to render it of great value for marketing; fruit brilliant red, with numerous white dots. Ripe Sept. 1 to 10."—Description of the originator, H. A. Terry, Iowa.

BURSOTO.—Said to be a hybrid of Burbank with De Soto, which would be *Prunus triflora x P. americana.* The tree and foliage are so strongly Americana in character that the variety may best be classed here unless the fruit, which I have not seen, shows distinct Japanese characters. Leaves very Americana-like in character, though rather thin and soft,

large, round oval, pointed above and rounded below, glabrous above, rather roughly tomentose over the entire lower surface, margin coarsely, deeply irregularly doubly-jagged toothed, petiole strong, with one or two glands.

Originated and named by Theodore Williams, Benson, Nebraska. See Vermont experiment station Bulletin 67:8, 1898.

California (California Seedling).—Fruit slightly oblate; size medium: cavity medium deep, flaring; stem long; suture a line; color bright red; dots many, minute, white; bloom blue; skin thick, tough; flesh yellow; stone medium size, nearly round, slightly flattened, cling; quality good; season medium.

Carver.—Fruit round oval; size small; cavity, shallow; stem slender; suture a line; color red; dots many, small; bloom blue; skin tough; flesh yellow; stone medium size, oval, scarcely flattened, cling; quality fair; season late.

Introduced by Charles Luedloff, Cologne, Minnesota. Not a promising variety.

CHAMPION

Champion.—Fruit round oval; size large; cavity medium deep, rounded; suture a line; color red over yellow; dots many, large, white; bloom white; skin firm; flesh yellow; stone large, oval, flattened, cling; quality good; season late.

Seedling of Hawkeye, grown by H. A. Terry, Iowa, and generally regarded as a good variety.

Cherokee.—"Above medium size, mottled red, round oblong, cling, Aug. 15-25. Tree lacks vigor and the variety will be dropped."—J. W. Kerr, Maryland. Said to have been found wild in Kansas.

Chippeway.—Fruit oblong; size small to medium; color deep red; skin medium thick; flesh firm, yellow; stone small, thickened, pointed, free; flavor sweet.

Generally held to be a poor variety.

Christie.—The following description is from Craig: "Form round truncate; size medium; apex flattened; cavity

wide; suture wanting; surface smooth; color yellow ground, covered by red; dots none; bloom light lilac; skin thick; flesh yellow, fairly firm, melting; stone circular, thick, laterally adherent to flesh; flavor sweet, luscious; quality best."

A wild plum taken from the woods by W. Christie, Villisca, Iowa, in 1887.

CITY.—Fruit irregularly spherical; size medium large; cavity medium deep; stem medium; suture shallow; color dark dull red; dots very minute; bloom blue; skin thick and tough; flesh yellow; stone large, oval, slightly flattened, cling; quality good; season medium to late.

A variety introduced by H. Knudson, Springfield, Minnesota, and highly regarded in that section. New.

COLORADO (Colorado Queen).—A large-fruited variety found in some collections, but not a favorite anywhere.

COMFORT.—Fruit oval; size very small; cavity shallow; suture a line; color dull red; dots many, minute, conspicuous; bloom blue; skin thick; flesh yellow; stone small, oval, flattened, partly free; flavor sweetish; quality fair; season of Wolf.

Introduced by M. J. Wragg, Waukee, Iowa, in 1879, and thought highly of in Iowa. The foregoing description is from specimens from J. W. Kerr, Maryland, with whom the variety is excessively worthless.

COMPTINE.—Fruit spherical; size very small; cavity shallow; suture a line; color light red; dots many, minute; bloom blue; skin tough; flesh yellow; stone small, oval, scarcely flattened, cling; quality bad; season medium.

Originated at Knoxville, Iowa. Without exception the poorest named plum I ever saw.

COOK'S CHOICE (The Cook's Choice).—Fruit round; size medium; color red over yellow; bloom bluish; skin thick; flesh yellow; stone cling; quality good; season medium.

Originated with H. A. Terry, Iowa, 1891. Ought to be renamed or suppressed.

COTTRELL.—Large, round oblong, mottled red and yellow, the red predominating; skin thin, parting readily from flesh, which is pale yellow, sweet and rich, adheres moderately to the sharp-edegd, strongly-margined stone. Ripe last of August. Described by Goff from samples from O. M. Lord. Seedling raised by R. L. Cottrell, Dover, Olmsted county, Minnesota, and introduced in 1888 by O. M. Lord, Minnesota.

CYCLONE.—"Grown from seed of Harrison's Peach. First crop of fruit in 1897. Tree a vigorous, spreading grower, and a fair bearer of fruit of large size, dark red color, and most excellent quality. Ripe August 25th to September 10th."
—Description of originator, H. A. Terry of Iowa.

Dahlgreen.—Introduced by Charles Luedloff, Cologne, Minnesota, and described by him as "medium, mottled red, oblong, freestone, medium season."

Deepcreek.—Fruit round oblong, compressed; size medium; suture conspicuous; color dull purple red; bloom blue; skin thick; flesh firm; stone half-free; flavor sweet; quality good; a little later than Wolf.

A variety found wild in Kansas and introduced by Abner Allen. Not generally successful.

Dennis (Dr. Dennis).—Fruit round or slightly oblong; size medium; cavity very shallow; suture a line; apex de-

DES MOINES

pressed; color bright red; dots many, minute, white; bloom blue; skin tough; flesh yellow; stone round flat, cling; quality good; season of Weaver; tree not very vigorous.

Originated with H. A. Terry, Iowa, bore first crop 1891. Not very generally recommended.

Des Moines.—Fruit round oval; size small; cavity very shallow; stem short; suture a line; color dull red over yellow; dots many, minute; bloom blue; skin thick; flesh yellow; stone small, oval, flattened, semi-free; quality poor; season between Forest Garden and Hammer.

De Soto.—Fruit oval, very slightly compressed; size medium; cavity shallow; stem medium long; suture a line; apex rounded; color orange heavily overlaid with crimson;

dots many, reddish; bloom blue; skin thick; flesh yellow, firm; stone oval, slightly flattened, cling; quality superior; season medium; August 5-20 in Maryland, September 1 in western New York. Tree not a very good grower and inclined to overbear.

Found wild on the Mississippi at De Soto, Wisconsin, and according to Bailey, introduced by Elisha Hale of Lansing, Iowa, in 1863 or 1864. Probably the most generally grown of any plum of the Americana group. The quality is unsurpassed and the productiveness almost too great. Trees should be highly fed and the fruit thinned, or the fruit will be small and the trees will soon kill themselves by overbearing. This has been found to be a profitable market plum as well as an excellent sort for home use. J. W. Kerr reports that the tree blights badly in Maryland.

Diana.—"Grown from seed of Hawkeye and produced first crop in 1893. Tree a vigorous, rather spreading grower and a wonderful bearer of the choicest fruit of large size; in color a dark red on yellowish ground; a very fine variety. Ripe August 20th to 30th."—Advertisement of the originator, H. A. Terry, Iowa.

Dunlap (No. 1).—"Above medium size, slightly oblong, red, free; August 25, September 15. A good variety."—J. W. Kerr, Maryland.

Eldora.—Another of Mr. Terry's seedlings, described as "medium to large, fine bearer, fine quality." Not yet generally known.

Emma.—A new variety originating in 1896 with H. A. Terry, Iowa. Yet unintroduced in 1899. "Fruit roundish; skin thin; size fair to medium; flesh very meaty for one of this class; stone large, adherent; flavor rather acid; quality good."—Craig.

Etta.—"Parentage unknown. Produced first crop in 1895. Fruit large, bright yellow, nearly overspread with bright crimson. Tree a slow grower, but very productive. Ripens midseason."—H. A. Terry, originator, Crescent, Iowa.

Fairchild.—Fruit oval; size medium; color red; dots large; quality fair. Grown by J. H. Fairchild, Iowa, in 1894. Introduced in 1899 by A. Snyder & Son, Center Point, Iowa.

Forest Garden.—Fruit nearly round; size large; cavity shallow; suture obscure; color purplish-red over orange; dots many, minute, yellow; bloom thin, blue; skin thick; flesh yellow or slightly reddened next the stone; stone round, but little flattened, cling; quality good to best; season of De Soto and Wolf.

Taken from the woods at Cedar Rapids, Iowa, by Thomas

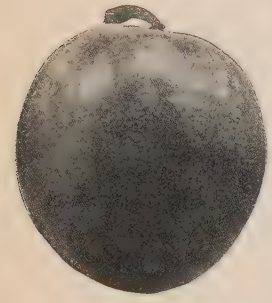
Hare, and introduced by H. C. Raymond of the Forest Garden nurseries, Council Bluffs, about 1862. A favorite variety, especially in the west.

FREE SILVER.—Fruit oval, slightly compressed; size large; cavity very shallow; suture a line; color dark red; dots many, minute; bloom bluish; skin thick; flesh yellow; stone large, round oval, considerably flattened, cling.

Raised and named by H. A. Terry of Iowa, who also originated the variety called W. J. Bryan. Generally thought to be one of the most promising new sorts yet introduced.

GALENA.—Introduced by Charles Luedloff, Cologne, Minnesota, and by him described as "large, yellow, with a little red, oval, cling, productive."

GALE (Gale Seedling).—Fruit roundish, compressed; size small or medium; suture distinct; apex slightly truncate; color dull red; skin thin; flesh yellow, soft; stone thick, rounded, nearly free; quality fair to good; season very early. "Tree very productive and much given to overbearing." Introduced by I. Gale & Son of Waukesha, Wisconsin(?).



GAYLORD

GARDEN KING.—Fruit medium to large, oval, scarlet; flesh sweet, juicy, small, freestone; tree rapid grower, heavy bearer.—A. R. Prescott, Postville, Iowa.

Found wild in 1853. Judge Elias Topliff of De Soto, Wisconsin, cultivated this in 1861; from him obtained by A. R. Prescott, Postville, Iowa, who introduced it in 1896.—Craig.

GATES.—"Fruit medium, flattened; suture distinct; very dull red with numerous yellowish specks about apex; skin thick; flesh yellow, of fair quality; stone distinctly margined; season late."—Described by Professor Goff from samples from E. H. S. Dartt, Owatonna, Minnesota.

Originated at Owatonna, Minnesota.

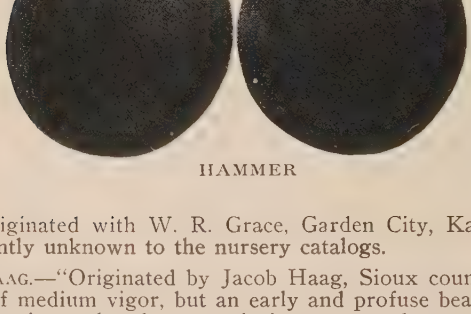
GAYLORD.—Fruit oval; size large; cavity very shallow; stem short and stout; suture a line; apex rounded; color dull crimson; dots many, very minute; bloom blue; skin thick; flesh yellow; stone large, oval, flat, cling; quality good to best; season, medium or early.

Introduced about 1890 by Edson Gaylord, Nora Springs, Iowa. Extensively planted and generally favorably reported. Said by many to be a profitable market variety.

GOLD (not the Gold of Stark Brothers).—Originated several years ago with H. A. Terry of Crescent, Iowa. Described by J. W. Kerr of Maryland as "large, oblong, golden yellow, blushed around the stem end with light red, cling; August 15-25. A very handsome plum of good quality." Appears to be a good plum, but not generally grown.

GOLD-COLORED.—A variety with this very unacceptable name was reported to Professor Goff by Edson Gaylord of Iowa. If it is to be introduced to the trade it must certainly have a better name.

GRACE.—Fruit oblong; size above medium; color yellow, striped with red, mottled and washed with dull purple; dots numerous, yellow; bloom thin; skin thick; flesh yellow, melting, juicy; stone oval, cling; flavor rich and sweet; quality very good; season September in Kansas.



HAMMER

Originated with W. R. Grace, Garden City, Kansas, but apparently unknown to the nursery catalogs.

HAAG.—"Originated by Jacob Haag, Sioux county, Iowa. Tree of medium vigor, but an early and profuse bearer; fruit medium size, red and very early in season and extremely high in quality. Ripens on my grounds next to Pottawattamie."—Description made for Professor Goff by Mr. Hinkley of Iowa.

HAMMER.—Fruit round oval; size medium to large; cavity very shallow; suture a line; color crimson; dots many, minute and a few larger, yellow; bloom blue; skin thick; flesh yellow; stone small, round, slightly flattened, nearly free; quality very good; season after Wolf and Weaver.

Originated with H. A. Terry, Iowa, who says it is a seedling of Miner, but thinks it has "an admixture of Americana blood." Whatever its parentage it is best classified with the Americanas. A fine variety.

HANSON.—Fruit nearly spherical; size medium; cavity shallow, broad; stem short; suture shallow; color bright red over yellow; dots many, dull yellow; bloom blue; skin very thick; flesh yellow; stone medium size, round, slightly flattened, cling; flavor sweet; quality excellent; season early.

"A good market plum."—J. W. Kerr, Maryland.

HART (Hart's De Soto).—Fruit oval; size medium; cavity shallow, flaring; stem slender, medium length; suture a line; color red over orange; dots many, small, yellow; bloom blue; skin tough; flesh yellow; stone small, oval, somewhat flattened, cling; quality good.

HAWKEYE

Origin, Iowa. A promising variety. Sent out by Iowa agricultural college.

HARTWICK.—A variety given in some lists, but uniformly reported unsuccessful. I have not seen it and do not know its history.

HAWKEYE.—Fruit round oval; size large; cavity very shallow; stem rather long; suture a line; apex sometimes slightly depressed; color dull red over yellow; dots many, minute; bloom thick, blue; skin thick; flesh yellow; size large, oval, flattened, cling; quality, good to best; season of De Soto.

Grown from seed of Quaker by H. A. Terry, Iowa. Bore the first crop in 1882. Has been widely distributed and is a deserving favorite. Good for market or home use.

HIAWATHA.—Fruit long oval; size medium to large; cavity shallow; suture a line; color dull dark red; dots fine and indistinct; bloom blue; skin thick; flesh yellow; stone medium large, oval, flattened, cling; quality poor; season medium to late. Sent out as a curiosity only by C. W. Heideman of New Ulm, Minnesota, and has not proved to be useful in orchard culture.

HOLT

HILLTOP.—Fruit round oval; size small in the only specimens examined; cavity shallow; stem short; suture a line; color deep red; dots very minute; bloom blue; skin thick; flesh yellow; stone large, flat, round oval, cling; quality fair to good; season medium to late.

HOLT.—Fruit irregular spherical, compressed; size medium; cavity shallow, flaring; stem slender; suture slight; color light red; dots many, minute; bloom blue; skin very thick; flesh yellow; stone large, round oval, hardly flattened, half-free; quality fair to good; season medium to late.

Origin with J. B. Holt of Rutland, Ohio(?) Compare U. S. Dept. Agr. Pomologist's Rept. 1891, p. 392.

HOMESTEAD.—A northwestern variety mentioned by Goff. No description is at hand.

HONEY.—Fruit oblate; size small; cavity shallow; stem short, slender; suture a line; color crimson or yellow; dots minute and indistinct; bloom blue; skin thick; flesh yellow; stone round, slightly flattened, cling; quality poor; season medium to early.

Conflicting reports are received concerning this variety. The quality is usually said to be high, but I have not found it so. Some find it productive; others unproductive.

HOSKINS.—Described by J. W. Kerr, Maryland, as follows: "Medium size, yellow, freestone; Aug 15-25."

HUNT.—Flattering reports are received of this plum. I have not seen it. It is said to have come from seed of Wild-goose, "supposed to have been pollenized by Lombard." Some Americana plums also grew in the vicinity of the parent tree. Mr. G. B. Brackett says that this variety "appears from foliage to be a hybrid between Americana and Domestica. As I have seen it growing I do not hesitate to call it pure Americana. Originated with Henry Hunt of Dallas county, Iowa, about 1885. Introduced by M. J. Graham, Adel, Iowa, 1897. Described by Craig as follows: Form roundish, oval, truncate at stem end; size medium; cavity shallow; suture clearly defined but not depressed; apex lobed slightly; color garnet; dots large, numerous; bloom heavy lilac purple; skin thin, free from astringency; flesh yellow; fairly firm, keeps well; stone ovate, winged, large; quality good; a desirable cooker.

IDA.—Fruit truncated, oval, irregular; size medium, cavity shallow; stem short; suture a line; color dull red; dots hardly visible; bloom thick, blue; skin thick; flesh light yellow; stone round, flattened, cling; quality fair; season medium.

Originated with D. B. Wier of Illinois.

IONA.—Fruit oval; size small to medium; cavity shallow; suture a line; color dull red; dots many, fine, yellow; bloom bluish; skin thick and tough; flesh yellow; stone medium size, oval, only a little flattened, cling; quality fair to good; season late.

Originated with D. B. Wier of Illinois.

IOWA.—An Iowa variety unknown to me except from young grafts.

IOWA BEAUTY.—An Iowa variety which I have seen only as nursery stock. Said by John Craig to be "small, regular oval, mottled yellow, flesh sweet, melting, season early, quality

good." Dr. A. B. Dennis says that its good points are earliness and high quality.

IRENE.—Fruit oval; size very small; cavity shallow; suture a line; color dark coppery red; dots very minute; bloom bluish; skin thick and tough; flesh yellow, firm; stone small, oval, not flattened, cling; quality poor; season late.

Originated with D. B. Wier, Illinois. Worthless.

IRONCLAD (Illinois Ironclad).—Fruit round oval; size medium; cavity medium deep, flaring; stem slender; suture shallow; color dark dull red; dots many, small, yellow; bloom thick, blue; skin thick; flesh yellow; stone medium large, round oval, flattened, cling; flavor sweetish; quality fair to good; season medium.

A wild variety from Illinois introduced by Stark Brothers, Missouri, in 1890.

ISAAC.—A wild variety from near Lincoln, Nebraska, described as "small, roundish oblong, green ground blushed with purplish-red, cling; August 25 to September 10 (Maryland). Too small, will be discontinued."—J. W. Kerr.

ISABELLA.—"Parentage unknown. Originated in 1893. Tree rather low and spreading. Fruit medium to large, round as a shot, dark red on yellow ground, fine quality, very productive. Midseason."—Description of the originator, H. A. Terry, Iowa.

IVASON.—"Large, round oblong, purplish-red, semi-cling; August 10-20."—J. W. Kerr, Maryland. "A strong growing tree; fruit looks and tastes much like Wyant, but is distinct and larger."—M. S. Hubbell, Toledo, Ohio. Origin, Iowa.

JESSIE.—Fruit oval; size medium; cavity shallow, abrupt; suture a line; apex slightly pointed; color dark red; dots many, very minute, white; bloom blue; skin tough; flesh yellow; stone broadly elliptical, flat, cling; quality good; season last of July in southern Kansas.

A wild variety introduced by Martin Nursery Co., Winfield, Kansas, about 1892.

JOE HOOKER.—Fruit round oval; size medium or larger; cavity shallow; suture a line; color red; bloom blue; skin thick; flesh yellow; stone cling; season late; tree dwarfish, with a very odd and characteristic habit.

JONES.—Fruit oblong; size medium to large; color red mottled; stone cling; season medium to late.

Originated under cultivation with Mrs. Owen Jones, Crescent, Iowa, in 1880. Introduced by H. A. Terry in 1895.

Jones Late.—Fruit long oval; size large; color red; stone cling; season late; tree vigorous and productive.

Origin same as Jones(?).

Kampeska.—Described by J. W. Kerr, Maryland, as "medium size or slightly above, roundish, purplish-red, cling; August 5-15." Generally discarded.

Kickapoo.—Fruit oval to nearly spherical; size medium; cavity shallow; stem short; suture a line; color dull red; dots many, conspicuous; bloom heavy, blue; skin thick; flesh yellow; stone medium size, oval, slightly flattened, cling; quality good; season medium.

Kieth.—Fruit long oval; size large to very large; cavity shallow; stem short and stout; suture a faint line; color orange overlaid with crimson; dots many, very minute, white; bloom blue; skin thick; flesh yellow, firm; stone large, oval, somewhat flattened, cling; quality good to best; season of De Soto and Wolf.

KIETH

One of the best Americanas.

Klondike.—"Golden yellow, freestone, very early." Originated in Iowa by cross-pollination. Introduced 1897 by W. F. Heikes, Hunstville, Alabama. Originated with J. Wragg & Sons, Iowa.

Kopp.—Fruit round; size large; color purplish-red; stone cling; season of Wolf.

Not widely known nor highly praised. Introduced by O. M. Lord, Minnesota City, Minnesota.

Knudson (Knudson's Peach).—Fruit round oval; size above medium; color purplish-red; stone cling; a little later than Wolf and Weaver.

Reports on this variety are conflicting. It would be safe to plant something else.

Labert (Labert Red).—Found in some collections. I have not seen it and do not know its history.

La Prairie.—A wild variety taken into cultivation in 1844 at Shopiere, Wisconsin, and reported to Professor Goff by B. H. Smith. No description.

Late Rollingstone.—Fruit oblate spherical; size small; cavity shallow; stem medium; suture faint; color red over

yellow; dots many, dull yellow; bloom thick, blue; skin thick, firm; flesh yellow; stone medium large, round, slightly flattened, cling; quality fair to good; season medium late.

Seedling of Rollingstone, grown by O. M. Lord, Minnesota. Thought by some to be the same as Rollingstone, but is different, being from one week to ten days later.

Le Duc.—Fruit medium, roundish or slightly oblong, slightly flattened, suture rather distinct; bright red, some specimens inclining to orange in spots, with thin bloom; flesh rich yellow, sweet and pleasant; semi-cling; skin rather thick, a little harsh; stone rather large, rounded at ends; season medium; tree vigorous, symmetrical, very productive."—Goff. "Fair quality, small size; not superior to many unnamed kinds." —Lord, Minnesota.

Found wild at Hastings, Minnesota, and introduced by W. G. Le Duc. Professor Goff speaks favorably of this variety, but as I have seen it, it is inferior.

Leonard.—Fruit round oval; size very small; cavity shallow; stem slender; suture shallow; color dull red; dots minute; bloom blue; skin very thick; flesh yellow; stone small, round oval, flattened, tends to be free; quality fair; season of Wolf.

Not well reported.

Lillie.—"Grown from seed of Hawkeye. First crop of fruit in 1893. Tree a strong, vigorous grower, upright in habit, and unusually productive of fruit of large size and best quality, in color a very attractive mottled red on yellow ground. One of the best varieties. Ripe midseason."—Description of the originator, H. A. Terry, Iowa. Favorably mentioned by Craig.

Lockey.—Unknown to me. Listed by J. W. Kerr, Maryland.

Lottie.—Described as "large to very large, white or pale yellow, freestone, quality best; ripe August 20-30 (in Iowa). Tree upright and remarkably productive."

Grown from seed of Van Buren by H. A. Terry, Iowa. Began bearing in 1895.

Louisa.—Fruit irregular oval; size medium; cavity shallow; stem short; suture a line; color dull red; dots many, small; bloom thick, blue; skin thick; flesh yellow; stone large, oval, flattened, cling; quality medium; season about the same as Wolf, Weaver and De Soto.

Found wild in Missouri and introduced by Samuel Miller, Bluffton, Missouri. J. W. Kerr of Maryland says: "Tree vigorous and productive. One of the best market varieties." Also favorably reported from Minnesota.

MACKLAND.—Unknown to me. Advertised by J. W. Kerr, Maryland.

MANITOBA.—"Medium size, roundish oval, clear red, freestone, July 20-30."—J. W. Kerr, Maryland.

Origin unknown to me.

MANKATO (German Prune Seedling).—Fruit oval; size medium to large; cavity shallow; stem short; suture a faint line; color dull red; dots many, dull yellow; bloom thick, blue; skin thick, tough; flesh yellow; stone large, oval, flattened, cling; quality good; season medium late.

Introduced by S. D. Richardson & Son of Winnebago City, Minnesota, in 1890. Thought to be a seedling of German Prune pollinated by some Americana. This is apparently a pure Americana, however.

MARCELLUS.—Described as "very large, inclining to oblong, white, becoming light red when fully ripe, quality excellent, season rather late."

Grown from seed of Van Buren and fruited in 1893 by the introducer, H. A. Terry, Iowa.

MARCUS.—Described as follows: "Tree strong, vigorous, upright grower, an early and profuse bearer, very regular. Fruit very large, round, dark red, of Miner style but larger and two weeks earlier. Meaty; quality high when fully ripe."

Originated by M. E. Hinkley from seed gathered on Little Sioux river, Iowa, 1874.

MARION.—Fruit irregularly spherical; size large; cavity very shallow; stem medium; suture a line; color dull red over yellow; dots many, yellow; bloom thick, blue; skin very thick; flesh yellow; stone large, oval, flattened, cling; flavor sweet; quality good; season medium early.

MARY.—Described as follows by the originator: "Fruit beautiful light red on light yellow ground, fine quality; tree rather spreading, but a good healthy grower; season last of August (in Iowa)."

From seed of Van Buren in 1893. Originated by H. A. Terry, Iowa.

MELON.—Said to be "rather a handsome plum of Hawkeye season, but no improvement on that variety."

From Iowa.

MINNETONKA.—"Medium in size, round oblong, dull red; skin thick; cling; flowers medium, calyx lobes glandless, hairy inside; leaves medium, pubescent; glandless, or nearly so. Medium season."—Bailey.

Introduced by P. M. Gideon, Minnesota.

Mollie.—A variety originating with Theodore Williams, Benson, Nebraska. Not yet generally introduced and unknown to me.

Monon.—Listed by J. W. Kerr, Denton, Maryland, but otherwise unknown to me.

Moon.—Described as follows by J. W. Kerr, Maryland: "Above medium to large, round oblong, purplish, cling, August 5-15 (in Maryland). Will be dropped here." I am unacquainted with the variety.

Muncy.—"Large, round oblong, dark purplish, cling; August 1-10 (in Maryland). Will be dropped."—Catalog of J. W. Kerr, Maryland.

Mussey.—"Very large, round oblong, yellow mottled with red, skin medium thick; flesh firm and excellent; semi-cling; leaves medium to large, pubescent, glands small or none; very late."—Bailey.

Wild, from Kansas. Introduced by Abner Allen.

Nellie.—Fruit oblate; size medium to large; cavity almost obsolete; stem medium; suture a faint line; apex sometimes slightly depressed; color light pinkish; dots many, indistinct; bloom blue; skin thick; flesh firm, yellow; stone medium size, round, compressed, partly free; quality good; medium to late.

Nellie Blanche.—"Parentage unknown. Produced first crop in 1897. So far as tested, this is one of the best varieties in cultivation. Tree a strong, upright grower, and so enormously productive that the tree is scarcely able to sustain its crop of fruit. Fruit large, oblong, dark mottled red, good quality."—From the advertisement of the originator, H. A. Terry, Iowa.

Neverfail.—"Fruit large, round, red, very beautiful, quality fine; ripe about with De Soto. Tree vigorous growth, slightly spreading. Purchased of an eastern nurseryman for Wolf, not true to name; introduced by J. S. Haag, Hosper, Sioux county, Iowa."—Craig.

Newton Egg.—Fruit oval; size small; cavity shallow; suture a line; color dull red; dots many, yellow; bloom blue; skin thick, tough; flesh yellow; stone large, long, oval, flattened, partially free; quality fair to good; season of Wolf and De Soto.

Originated with Charles Luedloff, Cologne, Minnesota.

New Ulm.—Fruit oval; size large; cavity shallow; stem stout; suture a line; apex slightly pointed; color orange heavily blushed with crimson; dots many, minute, white; bloom blue; skin tough; flesh yellow; stone medium size,

oval, flattened, cling; flavor sweet; quality good; season medium late. Tree a poor grower and subject to blight.

A Minnesota seedling introduced by C. W. Heideman of New Ulm. The fruit is large and fine.

North Carolina.—No definite information is at hand concerning this variety, except that J. W. Kerr of Maryland says that the tree blights badly.

North Star.—"Ripens a week before De Soto; a trifle larger, a little more oblong; juicy, sweet. Tree hardy, dwarfish; quality good; cling."—Penning, Minnesota.

Noyes.—Found in a few collections. Round, medium size, red, cling, season medium late. Perhaps this ought to be put into the Miner group.

Ocheeda.—Fruit oblique oval; size medium; cavity shallow and small; stem stout; suture faint; color crimson; dots medium large, yellow; bloom heavy, blue; skin tough; flesh yellow; stone medium size, oval, slightly flattened, cling; quality very good; season of Wolf and De Soto. Productive.

A wild Minnesota seedling introduced by H. J. Ludlow, Worthington, Minnesota. Generally regarded as valuable.

Old Gold.—Fruit round oval; size medium; cavity very shallow; stem slender; suture a line; color faint crimson overlying very pretty old gold; dots minute; bloom thin; skin thick; flesh yellow; stone medium size, round oval, flattened, cling; quality fair to good; season of Wolf and De Soto.

Introduced by C. W. Heideman, Minnesota. Reports concerning the merits of this plum are conflicting.

Omega.—"Parentage unknown. Produced first crop of fruit in 1897. Tree a model of perfection, unsurpassed in beauty and healthfulness and also in productiveness. Fruit very large, slightly oblong, light red, mottled and splashed with darker red, nearly covered with lightish dots. Very firm, a fine shipper; will keep in good condition several days after ripe. So far as tested, this will rank as one of the most profitable varieties in cultivation for market purposes. Ripe September 25th to October 10th."—From the advertisement of the originator, H. A. Terry, Iowa.

Owatonna.—"Fruit large, oblong, red throughout; suture distinct; of fair quality; stone rather thick. The tree is said to be moderately productive."—Goff.

Originated at Owatonna, Minnesota.

Pearl.—Described as follows: "Fruit white or pale yellow, ripening to light red; tree a fine upright grower; a good market variety; ripens last of August (in Iowa)."

From seed of Van Buren. Bore first crop in 1896. Originated with H. A. Terry, Iowa.

PEFFER PREMIUM.—Fruit slightly oblate; size small to medium; cavity very shallow; stem medium long; suture a faint line; color red over orange; dots many, small; bloom blue; skin rather thin; flesh yellow; stone round, flattened, cling or partially free; quality fair; season of Wolf.

A wild plum from Wisconsin, introduced by George P. Peffer, Pewaukee.

PENNING (Penning's Free).—A variety grown by M. Penning, Minnesota, but not yet generally distributed.

PILOT.—Professor Goff gives the following account of this variety: "Originated by M. E. Hinkley, 1874, from seed gathered on Little Sioux river, Cherokee county, Iowa. Tree bushy, spreading top, low. Fruit egg-shaped, very large, mottled yellow and pink; very prolific. Quality high for dessert. Pit long and thin, prune-shaped. Season medium. When ripening in wet season perhaps 10 per cent will crack on tree. Pronounced by local judges 'best' of twenty named sorts."

PLUNK (Large Red Sweet).—Fruit round; size large; color dark red; stone cling; quality good; season of Wolf.

Introduced by Charles Luedloff, Cologne, Minnesota.

PURPLE YOSEMITE.—Fruit irregular oval; size large; cavity shallow; stem short; suture a line; color dull orange red; dots many, minute; bloom thick, blue; skin very thick; flesh yellow; stone large, oval, flattened, cling; flavor sweetish; quality fair; season medium to late.

Reported favorably by some; unfavorably by others.

QUAKER.—Fruit round oval; size large to very large; cavity shallow; stem long, strong; suture a line; color dark red; dots many, yellowish; bloom thick, blue; skin thick; flesh yellow; stone large, oblique oval, flattened, more or less free; quality good to best; season medium early. J. W. Kerr, Maryland, says the tree blights.

Professor Bailey says that this was discovered wild by Joseph Bundy of Springville, Linn county, Iowa. Disseminated about 1862 by H. C. Raymond, Council Bluffs, and by him named Quaker in compliment to Mr. Bundy, who is a Quaker. The quality is high; in fact this is one of the best of the Americanas. It is regarded by many as being a choice variety in all respects.

QUALITY.—Under this illegitimate name there has been a variety distributed by Edson Gaylord of Iowa.

QUEEN (Golden Queen).—"Fruit very large, roundish oblong, bright golden yellow, delicious in quality, unexcelled

for canning and very fine for eating out of hand or for slicing and serving with sugar and cream like peaches; ripens latter part of August to September 10th (in Iowa). Tree a fine upright grower, with broad, healthy foliage."—Terry.

Originated with H. A. Terry, Iowa. Parentage unknown. Bore its first crop in 1897.

ROCKFORD

RARERIPE.—Mentioned by Keffer (South Dakota experiment station bulletin 26), but now apparently out of cultivation.

REEL.—"Grown from seed of Van Buren. First crop in 1896. Fruit large, white or pale yellow, with a beautiful red cheek, and of most excellent quality. Tree vigorous and healthy and very productive. Ripens last of August (in Iowa)." —From description of the originator, H. A. Terry, Iowa.

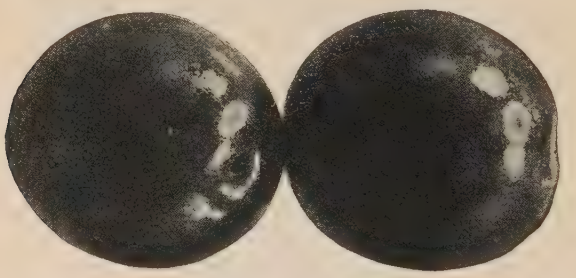
ROCKFORD.—Fruit round oval; size medium; cavity medium deep, rounded; stem short; suture shallow; apex some-

times slightly depressed; color dark wine red; dots very minute; bloom heavy, bluish; skin thick and tough; flesh yellow; stone large oval, hardly flattened, cling; quality good to best; season medium early, productive.

A wild variety introduced by C. G. Patten, Charles City, Iowa, 1889, and generally regarded as valuable.

Rocky Mountain (Rocky Mountain Dwarf).—Fruit irregular spherical; size small; cavity shallow; stem slender; suture a faint line; apex slightly depressed; color dull red; dots many, small; bloom blue; skin thin; flesh yellow; stone round, hardly flattened, cling; flavor sweetish; quality fair. Tree stocky and dwarfish, with very dark-colored bark, showing some characteristics of the Nigra group.

Sent out as a curiosity by C. W. Heidman of Minnesota. Worthless.



ROSELLE

Rollingstone.—Fruit irregular spherical; size medium or larger; cavity shallow; stem long; suture faint; color dull red; dots minute; bloom thick, blue; skin thick; flesh yellow; stone medium size, round, flattened, cling; flavor sweet; quality fair to good; season medium early.

Found over thirty years ago on the bank of the Rollingstone creek, Winona county, Minnesota, by O. M. Lord, and introduced by him about 1882. This variety has been widely distributed. In 1892 Professor Bailey said it was "one of the leading varieties." This is probably not true to-day, though it is still largely grown and highly regarded by some. Still the large number of good varieties introduced in recent years has left this somewhat in the shade.

Roselle.—Fruit round oval; size large; color yellow with red cheek; stone nearly free; flavor sweet; quality good; season September.

Originated with Ernest Hoffman, Roselle, Iowa, in 1892.

Rue (J. B. Rue).—Fruit round; size small; cavity shallow, flaring; stem short, slender; suture a line; apex slightly flattened; color red over orange; dots very small, white; bloom blue; skin tough; flesh yellow; stone round, not flattened, free; season medium late.

Comes from Iowa.

Sada.—Fruit spherical; size medium or larger; cavity shallow; stem medium; suture a line; color red; dots many, conspicuous, medium size; bloom blue; skin thick and tough; flesh yellow; stone medium size, round, slightly flattened,

SMITH

cling; quality fair to good: season medium; tree upright, productive.

Grown from seed of Van Buren by H. A. Terry, Iowa. First crop in 1893.

Silas Wilson.—Fruit irregular oval; size large; cavity very shallow; stem stout; suture a line; color dull yellowish with a crimson blush, or in the sun, red all over; dots many, red and yellow; bloom blue; skin thick, tough; flesh yellow; stone large, oval, flattened, cling; quality fair to good; season medium to late.

Grown by H. A. Terry, Iowa, from seed of Hawkeye, fruiting first in 1891. As I have seen this variety, it is superior.

Sloe.—Fruit oval; size small; cavity shallow, flaring; stem medium; suture a line; color bright red; dots many, white; bloom blue; skin thick; flesh yellow; stone medium size, oval, slightly flattened, cling; season early.

This variety is worthless as I have seen it.

Smith.—Fruit irregular oval; size large to very large; cavity very shallow; stem short and stout; suture shallow; color red or crimson over yellow; dots minute, indistinct; bloom thick, blue; skin thick, tough; flesh firm, yellow; stone large, broad oval, flattened, free; quality good to best; season medium early; tree vigorous and productive.

Grown from seed of Quaker by C. A. Smith, Caroline county, Maryland. One of the best Americanas I ever saw.

Snooks.—Fruit oval; size large; cavity shallow, flaring; suture a line; apex slightly pointed; color orange with red blush; dots many, small, white; bloom blue; skin tough; flesh yellow; stone medium size, elliptical, flattened, cling; flavor sweetish; quality good; season medium to late.

Minnesota(?). Thought by Craig to be the same as New Ulm.

Speer.—Fruit irregular oval; size medium; cavity shallow; stem medium long; suture a line; color light red; dots many, minute; bloom thick, bluish; skin very thick; flesh yellow; stone large, oval, slightly flattened, cling; quality good; season medium late.

Originated with J. A. Speer, Iowa. Very hardy.

Stella.—Grown by Theodore Williams of Benson, Nebraska, and named after his daughter. He says it is the earliest Americana, ripening with him about August 1st. He claims it to be of extra large size and fine quality. Not yet generally introduced.

Stoddard.—Fruit oblique oval; size large; cavity none; stem short and stout; suture a faint line; color pinkish red over yellow; dots very many, small, white; bloom bluish; skin very thick; flesh yellow; stone medium large, round-oval, flattened, cling; quality good; season medium early.

Introduced about 1895 by M. J. Wragg, Waukee, Iowa. Does well almost everywhere. Apparently one of the best and most reliable varieties of this group.

Truro.—Fruit oblong; size large; cavity small, shallow; suture shallow; color red; dots numerous, minute; bloom

whitish; skin thin; flesh yellow; stone medium size, oval, cling; quality good; season late; tree upright.

Said to be a seedling of Weaver crossed with Miner; grown by E. W. Tucker, Williamsfield, Illinois, about 1895.

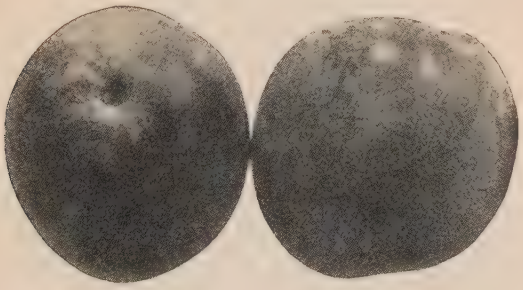
VAN BUREN.—Fruit round oblong; size large; color purplish-red; bloom blue; skin thick; flesh yellow; stone cling; season medium to late; young shoots pubescent.

An Iowa seedling introduced by J. Thatcher.

U. S. (Brittlewood No. 2).—Spherical, large to very large, dark purplish-red, cling, medium to late.

Originated with Theodore Williams, Nebraska.

VAN DEMAN.—Fruit oval, compressed; size large; cavity shallow; stem short and stout; suture a line; color dull red



STODDARD

over green, with red specks; dots many, minute, yellow; bloom bluish; skin thick; flesh yellow; stone medium size, oval, somewhat flattened, cling; quality good; season late.

Grown by H. A. Terry, Iowa, from seed of Hawkeye, 1891. Not generally reported favorably.

VERMILLION (Le Duc Vermillion).—Fruit round oblong; size medium; color bright red; bloom bluish; skin thick; flesh yellow; stone cling; quality good; season late.

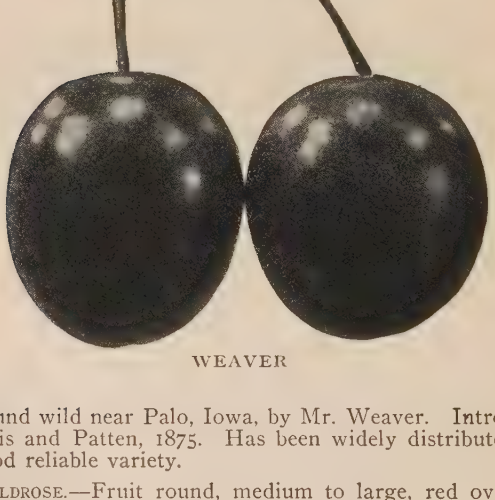
Origin same as Le Duc(?)

WARREN.—"Grown from seed of Hawkeye. Produced first crop in 1897. Fruit large, light mottled red with white bloom. Excellent quality. Season late in August (in Iowa)."—From advertisement of the originator, H. A. Terry, Iowa.

WATROUS (Captain Watrous).—"From seed of Harrison's Peach. First crop in 1897. Tree an upright, vigorous grower

and very productive of fruit of very large size; yellow ground nearly covered with bright red; in shape nearly round, and of excellent quality. Ripe last of August (in Iowa)."—Description of the originator, H. A. Terry, Iowa.

WEAVER.—Fruit oval, compressed; size large; cavity medium deep, rather abrupt; suture rather prominent; color orange heavily overlaid with red; dots many, minute; bloom bluish; skin thick; flesh firm, yellow; stone large, elliptical, pointed, flattened, half-free; quality good; season medium late; tree a strong upright grower, productive.



WEAVER

Found wild near Palo, Iowa, by Mr. Weaver. Introduced by Ennis and Patten, 1875. Has been widely distributed and is a good reliable variety.

WILDROSE.—Fruit round, medium to large, red over yellow, stone cling, season medium.

A Minnesota wild seedling introduced in 1880 by A. W. Sias, Rochester, Minnesota. Not generally commended.

WINNEBAGO.—"Above medium size, round oblong, usually with one side larger than the other, bright cherry red, cling. Will be dropped."—J. W. Kerr, Maryland. Season medium early.

Origin, Minnesota. Reports of this variety are almost unanimously unfavorable.

Wolf.—Fruit oval or round oval; size medium to large; cavity shallow; suture a faint line; color crimson over orange, marked like a bird's egg; dots several, red, pretty; bloom bluish; skin thick, tough; flesh yellow; stone medium large, oval, slightly flattened, perfectly free; quality fair to good, season medium early; tree a good grower and productive.

Originated on the farm of D. B. Wolf, Wapello county, Iowa, about 1852. One of the most popular of all native plums. Professor Goff says of it: "No variety has been more gen-

WYANT

erally commended than this. It is pronounced productive and regular in bearing from southern Iowa and Nebraska to Stonewall, Manitoba, and appears to be generally satisfactory. Some regard it rather too acid for culinary use."

Wonder (Nebraska Wonder of Sayles).—"Fruit large, round, a trifle smaller but resembling Green Gage in color, form and flavor; slight yellow tinge, mottled red when overripe, without astringency; ships well; season ten days earlier than Miner. Tree dwarfish, symmetrical, spreading, exceedingly prolific and a very early bearer."—Craig.

Found wild in 1892 by A. Webster, Burt county, Nebraska; introduced by H. P. Sayles, Ames, Iowa, in 1897.

Wood.—Fruit somewhat conical; size medium; cavity deep, flaring; stem short, slender; suture a line; apex pointed; color orange blushed with crimson; dots many, minute, white; bloom light, blue; skin tough; flesh yellow; stone oval, flat, cling; flavor sweetish; quality good; season medium.

Wyant.—Fruit oblique oval, compressed; size medium to large; cavity shallow, flaring; stem medium; suture a line; color pinkish-red; dots many, indistinct; bloom thick, blue; skin thick, firm; flesh yellow; stone medium, round oval, flattened, cling; quality good; season medium; tree spreading, strong grower, very productive. The Wyant plum originated at Waterloo, Iowa, with Mrs. Mary A. Wyant, who in 1871 planted the seed from a wild plum tree which bore extra large fruit. She says that the Wyant is not like the parent plum, however. Introduced to the public through Professor J. L. Budd.

Yellow Sweet.—Fruit round oblong, compressed; size medium; color orange, heavily marked with purplish-red; bloom bluish; skin thick; flesh yellow; stone round, flat, cling or partly free; flavor very sweet; quality good; season medium early.

Origin, Minnesota(?). Of doubtful value.

Yellow Yosemite.—A variety of no value, mentioned in some lists. I do not know it nor do I find any authentic description.

XXI

The Nigra Plums Named and Described

AITKEN.—Fruit oblique oval; size medium to large; cavity shallow; stem medium long; suture a dim line; color even dark red; dots very minute, hardly visible; skin thin, remarkably so for a plum of this group; flesh yellow; stone large, oval, very much flattened, cling; flavor moderately rich and sweet; quality good; season medium to early; tree vigorous and productive.

Found wild in Aitken county, Minnesota, by D. C. Hazelton; introduced in 1896 by Jewell Nursery company, Lake City, Minnesota. A promising new variety, highly regarded in the northwest.

AUGUST.—Fruit oblong; size large; color purplish-red; stone cling.

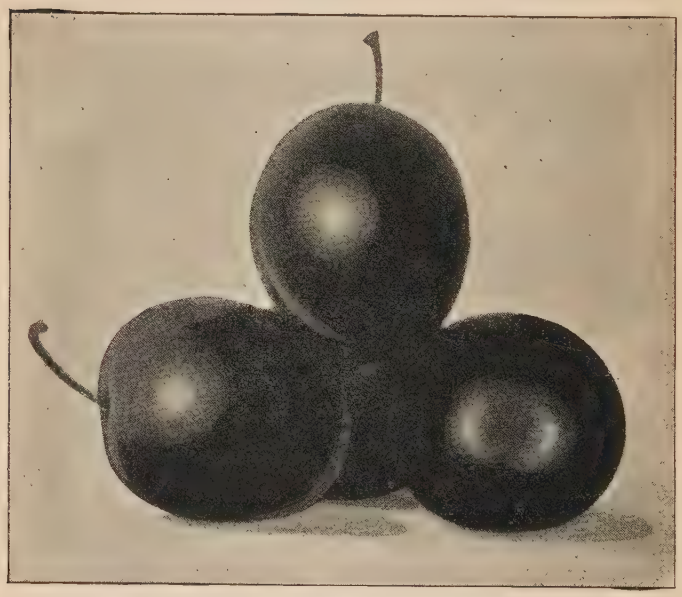
"Trees quite distinct in appearance, owing to the apricot-like foliage. Rapid, upright, nice growers, but not productive and will be dropped."—J. W. Kerr.

CHENEY.—Fruit irregularly oval; size large; cavity very shallow; stem stout; suture a faint line; apex slightly oblique, truncate; color dark, rather dull red; dots minute; bloom blue; skin thick; flesh firm and yellow; stone large,

pointed, oval, much flattened, cling; quality fine; season early. Tree a fine vigorous upright grower, with handsome, large ornamental flowers.

Found in Norman ravine, a few miles below La Crosse, Wisconsin, and introduced by E. Marcle, La Crosse. One of the best and hardiest varieties.

Crimson.—Described by Craig as follows: "Fruit large, 1½ to 1⅝ inches, light red, very showy; skin thin; stone



CHENEY

rather long, large, flattish; quality good; season earliest—last of July. Tree does not sprout, blossoms very early."—H. Knudson, Springfield, Minnesota.

Introduced by H. Knudson, Springfield, Minnesota.

Harrison (Harrison's Peach).—Fruit oval; size medium; cavity shallow; stem short, stout; suture a line; color dull dark red; dots minute, inconspicuous; bloom thick, blue; flesh yellow, red next the stone; stone medium large,

oval, flattened, nearly free; flavor very sweet; quality good; season medium.

Itasca.—Fruit oblong; size medium; color dull purplish-red; flesh fine, yellow; stone cling; quality fair; season medium.

Introduced by P. M. Gideon of Minnesota and by W. F. Heikes; origin, Minnesota. As I have seen this variety growing in Maryland it is entirely worthless.

Odegard.—A new variety of which I have seen specimens but of which I have no description. Originated at Brookings, South Dakota, ten or twelve years ago from seed sent from Minnesota. Introduced by A. Norby, Madison, South Dakota. Seems to belong in the Nigra group.

Oxford.—"Season early August. The earliest variety fruited here. Good cooker. Size of Forest Garden; round oval, deep red; rather thick skin; stone large, thin, cling; flesh orange-yellow, fair consistency, good flavor; poor keeper. Tree closely resembles Aitkin in foliage, color of wood, habit of growth and quality of fruit."—Harris, Minnesota, in Goff Wisconsin station Bulletin 63.

Seper (Seper's Peach).—Fruit round, oblong; size large; color dark red; stone cling.

Not much grown. I have never seen the fruit.

Smith Red.—Fruit round oval; size large or extra large for a plum of this group; cavity shallow; stem short, stout; suture a faint line; color dull red; dots minute; bloom thin, blue; skin thick; flesh yellow; stone large, oval, flattened, cling; quality fair to good; season medium. Tree vigorous with good foliage.

"The finest variety of the group with me."—J. W. Kerr.

Wazata.—Size small or medium; color dull red; skin thick; flesh yellow; stone cling; season medium to late.

Found wild in Minnesota and introduced by P. M. Gideon and W. F. Heikes. Worthless.

Williams.—Described by J. W. Kerr as follows: "Large, oblong, pointed, red, cling; only moderately productive."

XXII

The Miner-like Plums Named and Described

CLINTON.—Fruit spherical; size medium; cavity shallow; stem slender; suture a line; color dull red (not dark); dots many, yellow; bloom thin; skin firm; flesh yellow; stone oval, scarcely flattened, cling; quality medium; season late.

CRESCENT CITY.—Fruit oval; size medium; cavity shallow; suture a faint line; color dull red; dots many, minute; bloom thin, blue; skin medium thick; flesh yellow; stone large, oval, slightly flattened, cling; quality fair; season medium late.

Originated with H. A. Terry, Crescent, Iowa.

DECKER (Decker's Seedling).—Fruit somewhat conical; size medium to large; suture distinct; apex obscurely pointed; color red; dots many, yellowish; skin thin, free from harshness; flesh yellow; stone thick, rough, obscurely margined, nearly free; flavor "rich and delicious" (Goff); season medium.

Introduced about 1897 by W. S. Wedmoyer, Dresbach, Minnesota. "Thought by some to be identical with Miner."

Emerson.—Professor Goff mentions a plum under this name which he refers to the Miner group. This cannot be the Emerson described in this work with the Chicasaws. If it is a separate variety of any importance it should have another name.

Esther.—Fruit round oval; size medium; cavity shallow; stem strong; suture a line; color dark red; dots many, large and small, yellow; bloom thin, bluish; skin thick, firm; flesh yellow; stone small, oval, slightly flattened, cling; quality good; season medium early.

Introduced by H. A. Terry, Iowa, 1885.

Forest Rose.—Fruit oval; size large; cavity very shallow; stem stout; suture a line; color dull red; dots many, small, yellow; bloom thin; skin medium thick; flesh yellow; stone medium large, oval, hardly flattened, cling; quality good; season medium late.

"A Missouri wild variety introduced by William Stark in 1878." A fine plum, perhaps the best of the Miner group.

Idall.—Fruit irregular round oval; size large; cavity shallow; stem strong; suture a line; color red; dots many, minute and some large; bloom blue; skin thick and tough; flesh yellow; stone large, round, hardly flattened, cling; quality good; season late.

Said by the originator, D. B. Wier of Illinois, to be a cross between Miner and Wildgoose. Spelled also Idol. Mr. Wier himself used both spellings.

Indiana (Indiana Red).—Fruit oval; size medium to large; cavity shallow; stem slender; suture a line; color red; dots many, small, white; bloom thin; skin tough; flesh yellow; stone large, oval, little flattened, cling; quality fair; season late.

"Said to have been an Indiana wild variety and to have been introduced by Dr. I. Cramer."—Bailey.

Iris.—Fruit oval; size very small; cavity shallow; suture a line; color crimson; dots many, minute; bloom thin; skin tough; flesh yellow; stone small, oval, not flattened, cling; quality poor; season medium to late.

Originated and introduced by D. B. Wier, Illinois. Worthless.

Maquoketa.—Fruit round oblong; size medium to large; color red; skin thick; stone cling; quality good; season medium to late.

Found on the Maquoketa river in eastern Iowa. Reported not hardy in Minnesota. A good variety.

Miner (Parsons).—Fruit round oblong; size medium, often small; cavity shallow; stem slender; suture a line;

color dull red; dots many, yellow, conspicuous; bloom bluish; skin thick; flesh yellow; stone medium large, oval, slightly flattened, cling; quality fair to good.

One of the oldest native plums known; originated in 1814 in Knox county, Tennessee. Not so valuable as its wide reputation might indicate. Bailey gives the following history of this variety: "Said by Downing to have originated with Mr. Miner, Lancaster county, Pennsylvania, but this is a mistake. The seed which produced the Miner plum was planted in 1814, in Knox county, Tennessee, by William Dodd, an officer under General Jackson. Dodd appears to have had two batches of seed, one of which he gathered the year before upon Talaposa creek, and the other given him by an Indian chief. It is not clear from which lot this plum sprung. The plum gained some notice when it came into bearing, and was known as Old Hickory and General Jackson. In 1823 or 1824 Dodd moved to Illinois and settled near Springfield, taking some sprouts of his plum with him. The plums soon attracted attention among Dodd's neighbors, and the variety was called in its new home William Dodd and Chickasaw Chief. The year following William Dodd's removal to Illinois, his brother moved to Galena, Illinois, and took some of the plums. About Galena the plum became known as the Hinckley. I do not know how the name Miner came to be applied to it, but Downing's reference to Mr. Miner of Pennsylvania—who probably grew and disseminated it—undoubtedly explains it. It is said by D. B. Wier that the late Hon. James G. Soulard of Galena introduced this plum to general cultivation, and I repeated this statement last year in a discussion of the Soulard crab. (For a fuller history of the Miner, see A. Giddings in Iowa Agricultural Report, 1871, 332.) Downing gives Hinckley, Isabel, Gillett, Townsend and Robinson as synonyms of Miner. The Robinson now known is a very different fruit."

Nebraska.—Fruit oval; size medium; cavity shallow; suture a line; color red; dots many, fine, yellow; bloom blue; skin thick, tough; flesh yellow; stone medium size, oval, slightly flattened, cling; quality fair to good.

Oren.—"Form truncate, flattened, irregular; size large; apex oblique, basin slightly depressed; cavity none, flat; suture a dark red line not indented; surface smooth, not shiny; color greenish-yellow, yellowish-red to dark red; dots grayish marbling; bloom thin, purplish; skin thick, tough, acid, very slightly astringent; flesh firm, deep orange yellow; stone large oval, flat winged, adherent; flavor pleasant acid; quality good."—Craig.

The history of this variety is given by Mr. Oren as follows: "In the fall of 1876, I came from Benton county to this

locality, Spring Creek township, Black Hawk county, Iowa. Calling on Mr. Bingaman (now dead) I noticed a few young plum trees standing in his garden full of these plums. I bought a farm adjoining Mr. Bingaman; in the fall of 1878 I moved on the farm. Noticing at the edge of some timber and brush, a plum tree, apparently very old, that bore these plums (it is now dead), and some young trees standing at some distance from the old tree, I dug up and planted these young trees. From these I plucked the plums I sent you in September. These trees sprouted; so did those in Mr. Bingaman's garden; we permitted any person to take them that wanted them and they were gathered and distributed over this section of country and sent as far north as Minnesota, and to Nebraska. Some years ago Mr. Williams of Cedar Falls, now dead, came here and gathered all the trees he could get, and an armful of scions. He owned a nursery at that time there. I never heard anything from him after."

Prairie Flower.—Fruit round oval; size medium to large; cavity shallow, flaring; stem medium; suture a line; color red over light yellow; dots many, yellow, conspicuous; bloom thin, bluish; skin thick; flesh yellow; stone medium large, oval, slightly flattened, cling; quality excellent; season medium late.

Introduced by Stark Brothers, Missouri, about 1884, from Adrian county, Missouri. One of the best of the group.

Rachel.—Fruit oval; size small; cavity shallow; stem medium long; suture a line; color bright red; dots many, conspicuous; bloom blue; skin thick; flesh yellow; stone oval, thickened, cling; quality fair; season medium to late.

Origin unknown.

Surprise.—Fruit roundish oval; size large to very large; cavity small; stem medium long; suture distinct; apex sometimes obscurely pointed; color bright red; dots many, minute, yellowish; skin thin, tender; flesh pale yellow, fibrous, firm; stone oval, double-pointed, obscurely margined, cling; flavor rich; quality extra good.

Professor Goff, to whom I am indebted for this description, says that the tree is a good grower and promises to be productive. He thinks it is the finest in quality of the native plums. Recently introduced by Martin Penning, Sleepy Eye, Minnesota.

Wier (Wier's Large Red).—Fruit round; size large; color red; flesh yellow; stone cling; quality fair to good.

Originated by D. B. Wier, Illinois. Not favorably known.

Wilder (Colonel Wilder).—Fruit unequally elliptical; size medium to large; stem slender, persistent; color dark

dull red; dots white, numerous; bloom white; skin medium thick, firm; flesh firm, meaty, yellow; stone medium size, elliptical, cling; quality best; season medium to late.

Introduced by H. A. Terry, Iowa, 1888. Said to be a seedling of Wildgoose. This plum is anomalous in character. It seems to belong in the Miner group, but may perhaps be more at home in the Wildgoose group.

XXIII

The Wayland-like Plums Named and Described

AMERICAN GOLDEN.—Leaves are of the Wayland type, large, with crenulations less appressed than is usual in this group; petioles glandular; fruit slightly ellipsoid, medium size, cavity very shallow; stem medium long, slender; faint suture line; color bright golden yellow, solid; stone medium large, turgid, cling; flavor sweet but sprightly; quality good. Season late August and September. Introduced by James B. Wild & Brothers, Sarcoxie, Missouri. Originated from seed planted near that place. Very similar to Golden Beauty.

BENSON.—Fruit oval; size medium; cavity shallow; stem slender; suture a line; color bright red; dots many, yellowish; bloom thin; skin medium thick; flesh yellow; stone medium size, oval, scarcely flattened, cling; quality fair; season medium late.

Originated with Theodore Williams, Benson, Nebraska. Named and sent out by J. W. Kerr in 1898.

CAPTAIN.—(Synonym of Columbia, but not of the Domestica variety of this name described by Downing in Fruit and

Fruit Trees of America, 1st ed. [1845] p. 292). Fruit medium to large, spherical, bright golden yellow, with many conspicuous whitish dots, also with some fine black dots, the white dots appearing to be beneath the skin, suture line hardly visible, skin thin but tough; flesh medium firm, yellow; stone small, cling; quality good.

Crimson Beauty.—"Same type as Golden Beauty, ripening two weeks earlier, the tree somewhat more vigorous. Crimson Beauty is very similar to Wayland and Erby September, and I am not prepared to say yet that it is any better."—J. S. Kerr, Texas.

CUMBERLAND

"Tree much more vigorous, with heavier twigs and larger foliage than Golden Beauty."—J. W. Kerr, Maryland.

Cumberland.—Fruit slightly ovate or oblong, of large size, bright golden yellow, with many conspicuous whitish dots and sometimes with small black dots also; bloom white; skin thick and firm; flesh rather firm and meaty; stone medium large, cling; quality good; tree a vigorous grower, bark of young twigs yellowish, similar to Golden Beauty and Captain; quite productive. Introduced by Philip Schley, who gathered the pits from trees growing in the Cumberland mountains in Tennessee in 1864. There were a number of seedlings produced, but Cumberland, named by P. J. Berckmans, was the only one of value. Favorably reported from Louisiana.

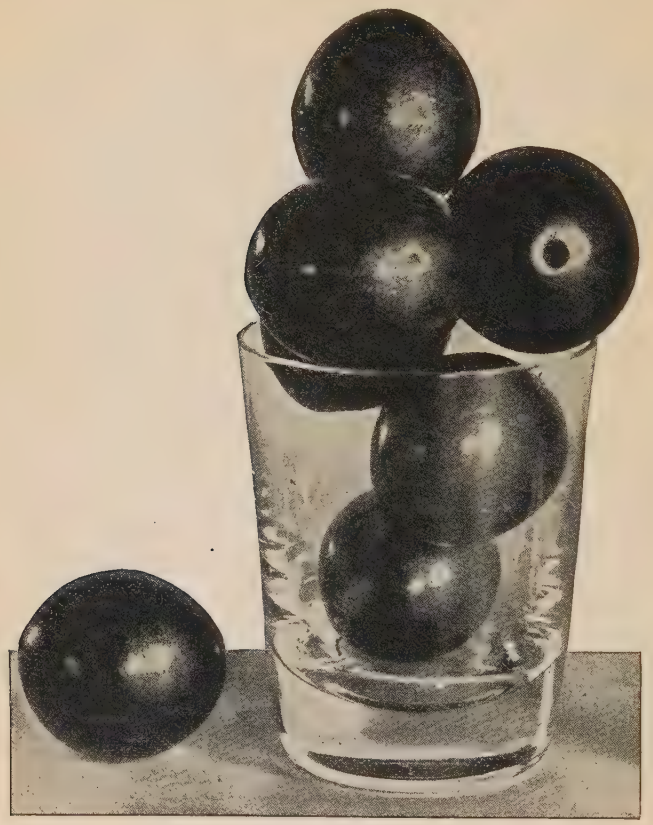
GARFIELD.—Fruit oval; size small and irregular; cavity shallow; stem slender; suture faint line; color bright red; dots many, yellow; bloom very thin; skin thin; flesh yellow; stone small, long oval, not flattened, cling; quality poor to fair; season medium to late.

GOLDEN BEAUTY

Said to have been found wild in Ohio. Introduced in 1887 by the late Leo Welz of Wilmington, Ohio.

GOLDEN BEAUTY.—Fruit spherical or nearly so, medium to large in size with a distinct suture line; color bright golden yellow, with many distinct white dots and a white bloom; skin firm; flesh firm, meaty, bright yellow; stone small, rounded,

cling; quality best. From southwest Texas. Introduced by Gilbert Onderdonk in 1874. It is said that this variety was brought from the headwaters of the Colorado river in western Texas



KANAWHA

by a German during the civil war. After the war he planted it in a yard in Victoria county, Texas, where it attracted the attention of Mr. Onderdonk, who introduced it.

Irby (synonym of Erby September of various catalogs).—"Fiery red; glossy, large as Clinton or Parsons (Miner), very similar to Golden Beauty, except in color; ripe August 9 to September 6, about same time as Golden Beauty. Seems to be identical with Wayland."—J. S. Kerr, Texas.

Named for Mr. Dan Irby of Texas, who found it growing on the grounds of an old Indian settlement in his vicinity. I have not seen the fruit, but the foliage identifies it with the Wayland group.

Kanawha.—Fruit ellipsoid, medium size, bright cherry red, with a suture line and many white dots and a faint white bloom; skin firm; flesh firm and meaty; stone medium size, cling; flavor sprightly; quality excellent. Introduced by P. J. Berckmans, who received it from J. S. Downer of Kentucky, in 1871.

Langsdon.—Described by Bailey in 1892 and said to be much like Miner. This evidently was a typographical error, as the Langsdon is an exact duplicate of the Moreman.

Leptune.—Fruit spherical or nearly so, medium size, color deep cherry red with an indistinct suture line and distinct yellowish dots, skin thick and strong; flesh meaty, yellow; stone medium size, cling; quality good.

"Said to have been introduced by J. D. Morrow & Sons, Arkansas."—Bailey.

Missouri Apricot (Honeydrop).—Fruit nearly spherical, small to medium, bright golden yellow with a plain suture line, many whitish dots, which seem to show through the skin, and a whitish bloom, skin rather thick and tough, flesh firm, meaty, yellow; stone small to medium, cling; quality fair to good. Bailey says "perhaps the best yellow plum," but this does not accord with our observations. J. W. Kerr says "the fruit is much inferior to Golden Beauty, with which it ripens."

This variety really ought to pass under the name of Honeydrop, which is the older, and which was changed to Missouri Apricot quite without warrant. It is so much better known, however, under the latter name that convenience may be thought to outweigh priority. The latter name is therefore retained.

Moreman.—Fruit spherical, small, bright cherry red, with a faint suture line and many distinct small yellow dots; skin strong; flesh firm yellow; stone usually small, rounded, cling; quality good. Season rather late, last of August. Origin Kentucky. Perhaps the hardiest of this group, and certainly the best known northward, but hardly typical of the group and not the best in fruit.

Nimon.—Fruit oval; size medium; cavity very shallow; suture faint line; color bright red; dots many, large, white;

bloom white; skin tough; flesh yellow; stone small, oval, flattened, cling; flavor, sweetish; quality good; season medium.

Introduced by T. V. Munson of Texas in 1897.

Peachleaf.—Fruit spherical, medium size; cavity slight, deep wine red with a faint suture line and many small dots; skin thick and strong; flesh very firm, yellow; stone medium size, roughened; quality good. This is very much like Moreman, though the foliage seems to be a trifle more peach-like and nearer the type of this group. The variety was received from B. A. Mathews of Iowa, who says he has been growing it for twenty-five years, but does not know its origin. It is probably a distinct variety of this group, hitherto undescribed.

Pontotoc.—Mentioned as not yet fully tested, and referred to this group by Mr. Ramsey.

Reed.—Fruit spherical or nearly so, small to medium, dark cherry red with a faint suture stripe and many distinct yellowish dots; skin thick and firm; flesh meaty, yellow; stone medium size, turgid, half-free; quality fair. Ripens with Moreman. Grown by Mr. O. H. Reed of Hightstown, New Jersey, from seed of native plums from Illinois. Propagated and introduced by Mr. Charles Black of Hightstown, who writes me that it has been abandoned since the introduction of Wildgoose and the Japanese varieties.

The tree of Reed is one of the finest, with extraordinarily large, brilliant green foliage.

Sucker State.—Fruit round or roundish; size medium; cavity shallow; stem slender; suture a line; color dark wine red; dots many, small, yellow; bloom none or thin; skin thin; flesh yellow; stone medium size, short oval, not flattened, cling; quality good; season late.

Origin, Illinois(?).

Wayland.—Fruit spherical, medium to large, bright cherry red with a distinct suture line and many distinct white dots and a thin white bloom, skin thick and firm, flesh firm, meaty, yellow; stone medium cling; quality good. Introduced by Downer & Brother, Fairview, Kentucky. First propagated in 1876. Came up in a plum thicket in the garden of Professor H. B. Wayland, Cadiz, Kentucky. Described and illustrated in Report United States Department Agriculture, 1888, p. 573. A valuable variety.

"The red coloring always has a pinkish hue here. Tree a vigorous upright grower while young, assuming a weeping habit when older; foliage large, bright and healthy."—J. W. Kerr, Maryland.

Worldbeater.—Fruit spherical or nearly so, medium to large, bright wine red with numerous large white or yellowish

dots and a light white bloom, skin thin but strong, flesh rather soft and juicy; stone small, cling; quality good. Hardy in Vermont. The seed from which Worldbeater grew was brought from near Nashville, Tennessee, in 1838, by J. H. Tinsley. It was planted in Lincoln county, Kentucky, and the stock transferred in 1849 to Clay county, Missouri. The variety was introduced by Stark Brothers in the fall of 1890. Very similar to Wayland, and perhaps identical with that variety.

Yellow Oregon.—Specimens received from Mr. B. A. Mathews, Iowa. So far as can now be learned the variety is hitherto undescribed. Fruit nearly spherical, small, bright golden yellow with a faint suture line and many whitish dots, skin thick and strong, flesh yellow and not very firm, stone rather large, smooth, cling; quality medium. Inferior in size and quality to Captain or Cumberland.

XXIV

The Wildgoose Varieties Named and Described

HOPTANK.—Fruit oval; size above medium; cavity shallow; stem long, strong, and holds fast; suture a faint line; color bright red; dots many, fine, yellow; bloom thin, bluish; skin medium thick; flesh yellow; stone medium size, oval, flattened, cling; quality fair to good; season medium early.

Originated and introduced by J. W. Kerr, Maryland.

CLARA.—A variety mentioned in Texas Experiment station Bulletin 32, p. 482. I know nothing about it.

CLARK.—Fruit round; size small to medium; apex truncate; color red; stone cling; season of Wildgoose.

Said to have been found wild in Anne Arundel county, Maryland. This statement should not be relied on, however. Not a valuable variety.

CLIFFORD (Mrs. Clifford).—Fruit pyriform; size large; cavity almost obsolete; suture a line; color red; bloom conspicuous; skin thin; flesh yellow; stone semi-cling; quality good; a little later than Wildgoose.

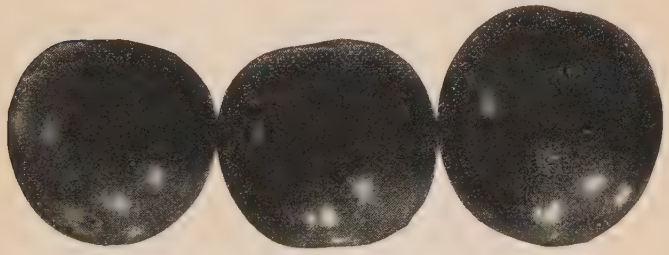
Originated in northern Texas, and said to be a seedling of

Wildgoose. Introduced by E. C. Clifford. Regarded as valuable in its native section.

Davis.—"Fruit large, bright red and good quality. Tree a low-spreading, but quite vigorous grower; fairly productive. Grown from seed of Wildgoose in 1885."—From advertisement of the originator, H. A. Terry, Iowa.

Downing (Charles Downing).—Fruit round oval; size large; cavity medium depth, rounded; stem slender; suture a faint line; apex very slightly depressed; color bright solid red; dots many, minute; bloom thin, bluish; skin thin; flesh yellow; stone medium size, oval, flattened, cling; quality good to fine; season a week after Wildgoose.

Grown by H. A. Terry of Iowa, from seed of Wildgoose, fruiting first in 1885. One of the best varieties of this group.



HOLLISTER

Dunlap (No. 2).—Fruit oval; size large; cavity shallow; suture a line; color bright red; dots many, minute; bloom thin, bluish; skin thin; flesh yellow; stone medium size, oval, much flattened, cling; flavor sweet; quality good to best; season medium.

A good profitable commercial variety. Originated by J. P. Dunlap of Nebraska.

Fanning.—Fruit round oval; size medium; cavity shallow; suture a line; color bright red; dots many, white; bloom white; skin medium thick, firm; flesh medium firm, yellow; stone medium size, oval, very slightly flattened, cling; quality fair to good; season medium.

Came up in the yard of Mr. Fanning, Rockdale, Texas. Probably a seedling of Wildgoose. Introduced by J. M. Shell of Georgetown, Texas, and largely distributed by C. L. Shell of the same place.

Freeman.—Fruit round oblong; size large; color red; stone cling; season medium early.

One of H. A. Terry's Wildgoose seedlings, Iowa, 1885.

Hollister.—Fruit oblong spherical; size above medium; cavity shallow; stem slender; suture a faint line; color bright red; dots few; skin thin; flesh soft, yellow; stone medium size, oval, slightly flattened, cling; flavor sweet; quality good; season medium to late.

Origin unknown.

Indian Chief.—Fruit oval; size medium; cavity shallow; stem short, slender; suture a faint line; color bright red; dots many, white; bloom blue; skin thick; flesh yellow; stone medium to large, long oval, flattened, cling; flavor flat; quality poor; season medium early. "Fruit drops as soon as colored."—Kerr.

Origin in dispute.

James Vick.—"From seed of Wildgoose. First crop in 1885. Tree a spreading, straggling, but vigorous grower, with fruit of large size; round, bright red, good quality and quite productive."—From advertisement of the originator, H. A. Terry, Iowa.

Jewell.—Fruit round; size medium or larger; cavity shallow; suture a line; color yellow overspread with red; flesh yellow; stone cling; season medium to late. "Tree vigorous, open or spreading, with handsome bright foliage, narrower than Wildgoose leaves."—Kerr.

Another of Mr. Terry's Wildgoose seedlings, Iowa, 1885.

Kelly.—This variety I find mentioned in the catalog of the J. Van Lindley Nursery company of Pomona, North Carolina. It is there said to have been introduced by R. Bates, Jackson, South Carolina. It is described as being of medium size, yellow, quality good, a prolific bearer, ripening in May, "thus being the earliest plum ever introduced."

Kroh (Poole, Poole's Pride).—Fruit oval; size small to medium; cavity shallow; stem slender; suture a line; color bluish; skin thin; flesh yellow; stone medium size, oval, somewhat flattened, cling; quality good; tree productive.

Introduced by Stark Brothers in 1893 under the name of Poole's Pride. The previous history of the variety is uncertain, except that it had long been known as Kroh.

Lancaster.—A new variety, grown by Charles B. Camp, of Cheney, Nebraska, from Wildgoose seed thought to have been pollinated by Miner.

Macedonia (Transparent).—Fruit oval to nearly spherical; size medium or small; cavity shallow; stem short;

suture a line; color bright red; dots many, white; bloom thin, bluish; skin thin; flesh yellow; stone medium size, slightly flattened, cling; quality fair to good; season medium.

Milton.—Fruit oval; size medium to large; cavity shallow, abrupt; stem slender; suture obsolete; apex sometimes slightly pointed; color bright red; dots many, white, conspicuous; bloom whitish; skin thin; flesh yellow, rather soft; stone large, oval, slightly flattened, cling; flavor sweet; quality good; season early.

Seedling of Wildgoose, grown by H. A. Terry, Crescent, Iowa, about 1885. One of the best of the group. A successful commercial variety.

Mississippi (Mississippi Red).—Fruit oval; size large; cavity very shallow; suture obsolete; color fine, clear red; dots many, yellowish; bloom white; skin thin but tough;

MILTON

flesh soft, yellow; stone medium size, slightly flattened, oval, cling; quality good; season medium.

Introduced by J. M. Shell of Georgetown, Texas, some twenty-five years ago, but dropped from cultivation. It is, however, one of the best fruits of the Wildgoose class which I have seen, and ought to be brought back into cultivation.

Mrs. Cleveland.—"Fruit large, light mottled red, oblong and slightly pointed at both ends, excellent quality, with a small pit. Tree a strong grower, of spreading habit and quite productive."—From catalog of introducer, H. A. Terry, Iowa. Seedling of Wildgoose, 1883.

Ohio (Ohio Prolific).—Fruit round; size medium; cavity shallow; stem slender; color bright red; skin thin; flesh yellow; stone cling; season medium.

Not valuable.

Osage.—Fruit oval; size small to medium; cavity shallow; stem slender; suture a line; color bright red; dots many, whitish; bloom thin; skin thin but strong; flesh yellow; stone medium size, oval, flattened, cling; quality fair to good; season medium.

Roulette.—Fruit oval; size medium and larger; cavity shallow; stem slender; suture a line; color bright red; dots many, large and small, yellow; bloom thin, bluish; skin thick

MISSISSIPPI

and strong; flesh yellow; stone medium size, oval, flattened, cling; quality good; season medium.

Origin Texas(?).

Schley (Schley's Large Red).—Fruit compressed, oval; size medium; cavity medium depth; stem medium length; suture slight; color bright, light red; dots many, colorless; bloom, whitish; skin tough; flesh yellow; stone cling; quality fair; season medium.

"Said to have been introduced from Georgia by W. K. Nelson."

Smiley.—Fruit irregularly oval; size medium; cavity shallow, rounded; suture a line; color bright red; dots

many, small; bloom bluish; skin tough; flesh soft, yellow; stone medium size, oval, somewhat flattened, cling; quality good; season about with Wildgoose.

A fairly good variety; valued by J. W. Kerr for its efficiency in pollinating Wildgoose. Origin Alabama(?).

Sophie.—Fruit pyriform; size medium to large; cavity shallow, abrupt; stem long, slender; suture faint, color bright red; dots many, small, distinct; bloom whitish; skin firm; flesh yellow; stone medium size, oval, flattened, cling; quality good; season medium.

SMILEY

Originated by J. W. Kerr, Maryland, and introduced by him in 1894. Has peculiar small pinkish and very pretty blossoms.

Suwanee.—A southern variety said to be "quite similar to Wildgoose, but larger and generally a better bearer." Perhaps best regarded as a synonym of Wildgoose.

Texas Belle (Paris Belle).—Fruit nearly spherical; size medium to large: color red; stone short, hardly flattened, cling; quality fair to good; season medium.

Introduced by J. T. Whitaker, Tyler, Texas. Originated with Stephen H. Turner, Texas.

Thousand-and-One.—Fruit round; size small; cavity

medium; suture a faint line; color bright red; dots many, minute, distinct; bloom bluish; skin thin; flesh soft, yellow; stone small, oval, thickened, cling; quality poor; season medium.

Of no value. Origin unknown.

Tucker.—Fruit pyriform; size medium to large; color light purplish-red, over greenish-yellow; dots many, small, gray; skin thick, tender; flesh yellow, tender; stone large, cling; flavor mild; quality good; season medium to late.

Originated with Ezra W. Tucker, Williamsfield, Illinois. Fruited first in 1894.

Van Houten.—An unidentified seedling grown by H. A. Terry, Iowa, probably belongs here; 1895.

Whitaker.—Fruit oval; size medium to large; cavity shallow; stem medium; suture a line; color bright red; dots many, white, easily seen; bloom thin, bluish; skin thin but firm; flesh yellow, moderately firm; stone small, long oval, pointed, flat, cling, exactly like Wildgoose; flavor sweet and good; quality good; season of Wildgoose.

Seedling of Wildgoose; originated under cultivation with J. T. Whitaker, Texas. Resembles the parent closely, but tree is of more open growth and blossoms later. A first-rate variety.

Wildgoose.—Fruit oval; size medium to large; cavity shallow; stem medium long; suture a line; color bright clear red; dots many, white, conspicuous; bloom thin, light bluish; skin thin, but rather tough; stone small to medium, oval, pointed, cling; flavor sweet; quality fair to good; season early.

Tree a healthy, vigorous spreading grower, blooming medium early, in large snowy banks, which present a fine appearance. This variety, more noticeably than most others, requires cross-pollination. The quality is not extra, but on account of its earliness, productiveness, fine color and good shipping quality, this has proved a very profitable plum. There are many other varieties just as good or better, though less well known and not so generally planted. This is the first native plum to be generally propagated and planted.

Bailey gives the following history of the variety: "The Wildgoose was first brought to notice by James Harvey of Columbia, Tennessee. Some time before 1850 a man shot a wild goose near Columbia, and on the spot where the carcass was thrown this plum came up the following spring. It was introduced about 1850 by the late J. S. Downer of Fairview, Kentucky."

Wildgoose, Yellow.—Yellow Wildgoose is said to have been introduced by R. Bates, Jackson, South Carolina, who

describes it as follows: "Large, equal in size to Wildgoose and ripening at the same time. The original tree rarely misses a crop. The tree is known to be at least sixty-three years old and is in perfect health and bearing condition. The quality is better than Wildgoose."

WOOSTER.—Mentioned by Goff, Wisconsin Experiment station Bulletin 63.

WOOTEN.—Fruit oblong; size large; cavity shallow; suture a line; color bright red; dots white; bloom white; skin thin; flesh yellow, rather firm; stone cling; quality good; season a few days after Wildgoose.

Tree has dark-colored bark, is a fine, upright grower with good foliage. A good variety in all respects. Found wild in the valley of the Colorado river, Burnet county, Texas, in 1876, by F. T. Ramsey and introduced by A. M. Ramsey & Son.

XXV

The Chicasaw Plums Named and Described

AFRICAN.—Fruit medium large, nearly spherical, dull dark red, with large white dots; skin thin but tough; flesh soft, yellow, watery, good quality; stone cling. Tree small, spreading, rough, somewhat thorny, branches rather short and stiff, bark dark-colored; leaves large for a Chicasaw, broad and blunt-pointed. One of the better Chicasaws. Originated with G. Onderdonk, Texas, and introduced by him in 1870.

ARKANSAS (Arkansas Lombard).—Fruit round oval; size medium; cavity very shallow; stem long, slender; color bright red; dots many, minute, white; bloom white; skin thin; flesh soft, yellow; stone medium size, oval, cling; quality good; season medium early.

This variety is a favorite in many places southward, where it is said to be hardy and productive. Said to have originated in Arkansas and to have been introduced by J. D. Morrow & Sons. The name Lombard has no apparent relevancy.

BEATY (Beaty's Choice, El Paso).—Fruit spherical to oblong; size medium; cavity shallow; color light crimson red; dots many, yellow; bloom thin, bluish; skin medium

thick, tough; flesh yellow; stone small, oval, turgid, cling; quality good. (This description made from fruit from the orchard of J. W. Kerr, Maryland, does not agree with Bailey's description.)

Originated in Luling, Caldwell county, Texas, with Lea Beaty and introduced by him in 1877. As I have seen Beaty it is somewhat different from El Paso, but the two names were originally applied to the same variety.

Caddo Chief.—Fruit ovoid, slightly pointed, small, bright cherry red, with white or bluish bloom, dots hardly visible,

AFRICAN

and a faint suture line; skin tough; flesh red; pit comparatively large, round, cling; quality poor; very early. Tree thick and spreading, productive.

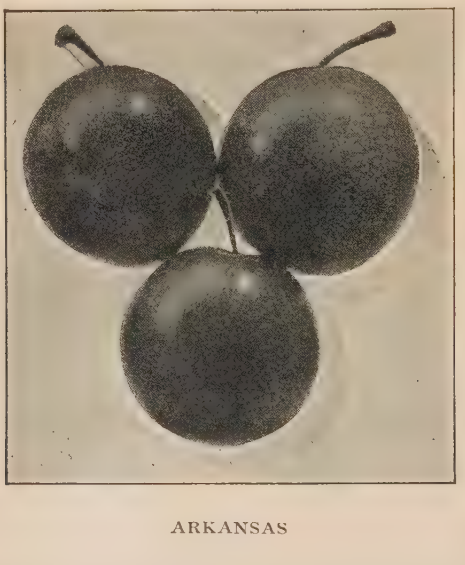
Found wild in Louisiana. Introduced by G. W. Stoner. This is a very early plum, ripening in May in the southern states, and has been highly recommended by some, but the general opinion seems to agree with my own observation, that the variety is strictly third-rate.

Clark.—Fruit irregular spherical; size small; cavity medium deep, broad; stem short; apex slightly indented; color bright red; dots many, minute; bloom bluish; skin tough; flesh yellow; stone medium to large, oval, very slightly

flattened, cling; quality good; season medium early. A good pollen bearer for other varieties.

Cluck.—Fruit oval; size medium to large; cavity shallow; color bright red; dots many, small; bloom white; skin tough; flesh yellow, soft; stone medium size, oval, but little flattened, cling; quality fair to good; season late.

This new and promising variety originated with George Cluck, near Austin, Texas, and was introduced in 1896 by F. T. Ramsey. It is very late in blossoming (for a Chicasaw)



ARKANSAS

coming in with many of the Wildgoose group, so that it may perhaps prove useful for the pollination of such varieties as Miner, Sophie, Charles Downing, Dunlop, James Vick and Forest Rose.

Coletta.—Fruit medium to large, round or oblong; light red; skin tough; flesh yellow; stone cling; flavor good when fully ripe. Tree rather upright and thorny, hardy, early.

Originated with G. Onderdonk in southern Texas, who introduced it in 1874. There are several better.

Drouth King.—Fruit oval; size small; cavity very shallow; stem slender; color bright red; dots many, conspicuous;

bloom bluish; skin thin; flesh yellow; stone medium size, oval, flattened, cling; quality good; season medium to late.

Origin unknown.

Early Honey.—"An early variety, evidently a Chicasaw, which originated in Grayson county, Texas."—Bailey, Cornell Bulletin 38. This variety seems to be lost from the nursery lists.

Early Red (not the Russian variety of this name).—Fruit round or slightly oblate; size small; cavity deep, broad; stem slender; suture obsolete; color clear red with lighter splashes; dots few, white; bloom white; skin thin; flesh soft, yellow; stone medium to small, rounded, cling; flavor sprightly; quality good; season early.

Originated in southern Texas with G. Onderdonk and introduced by him in 1872. Second or third-rate.

Emerson (Emerson's Early).—Fruit round or slightly oval; size small; cavity shallow; stem slender; suture not visible; color bright red, sometimes faintly splashed; dots many, white; bloom white; skin tough; flesh yellow, soft; stone medium size, turgid, cling; flavor sweet; quality fair to good.

Found wild in northern Texas and introduced by Mr. Bruce. Said to be a good variety in its native state.

Emerson Yellow.—A Texas seedling of Emerson and thought to be an improvement on that variety. New and untested.

Heep.—"Some old variety growing in Mr. Heep's orchard I cannot name. Tree very vigorous, resembling Piram. Bears heavy crops annually, of good-sized, red plums."—F. T. Ramsey, Austin, Texas, catalog of 1897-98.

Hoffman.—"Medium to rather large, round, purple-red; leaves medium, oblong, lanceolate; midseason to late. A wild variety from southwestern Missouri."—Bailey, Cornell Bulletin 38.

I find no trace of this variety except the foregoing description, written by Bailey in 1892.

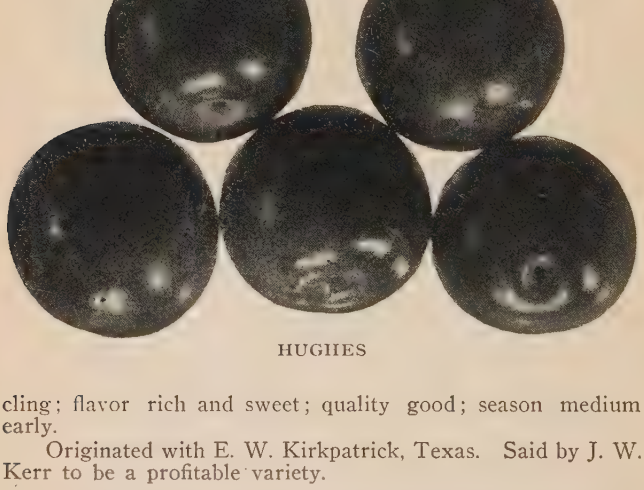
Hughes.—Fruit round or a trifle oblate, medium size, with a shallow rounded cavity and a long, slender stem; suture marked by a red line; color bright pinkish-red, striped with yellow; dots large, white; bloom white; skin thin; flesh yellow, stringy, watery; stone medium size, turgid, cling; flavor sprightly, subacid; quality fair; season late; tree small, productive.

Said to have come from northern Mississippi. One of the better Chicasaws.

Jennie Lucas.—Fruit irregular, spherical; size medium; cavity shallow; suture a line; color light yellow; dots many, large, white; bloom white; skin thin; flesh yellow and soft; stone large, round, flattened, cling; flavor sweetish; quality fair; season medium early.

Another of Mr. Onderdonk's Chicasaw seedlings, introduced in 1875. Texas.

Lone Star.—Fruit oval, pointed; size medium; cavity broad, shallow; stem slender; suture obsolete; color clear red; dots many, white; bloom white; skin thin but strong; flesh soft, yellow; stone medium size, oval, slightly flattened,



HUGHES

cling; flavor rich and sweet; quality good; season medium early.

Originated with E. W. Kirkpatrick, Texas. Said by J. W. Kerr to be a profitable variety.

Ludor.—"Above medium size, oblong, bright red; skin very thin; flavor rather acid unless fully ripe; tree fairly vigorous and productive."—R. H. Price, Texas Bulletin 32.

Mason.—Fruit above the medium size, round or somewhat oblong, bright red, quite firm, fine flavor when ripe, cling. Early or very early.

Orginated with Messrs. Mason, near Leander, Williamson county, Texas, and introduced about 1896 by F. T. Ramsey(?). Thought to be a good variety.

McCartney.—Fruit medium to large size, round or ovoid, bright golden yellow, with white dots and a visible suture, skin moderately thick, flesh sweet and melting, quality extra; stone rather large, oblong, cling. Early.

This plum was sent me in May, 1898, by Mr. F. T. Ramsey of Austin, Texas. I was very favorably impressed with it, except for its yellow color, which would prove a disadvantage in most markets.

McPherson.—"Fruit rather small, round, golden yellow; skin brittle; flesh yellow; quality only fair; cling; tree low and bushy, thorny, fairly productive, hardy."—Price, Texas Bulletin 32.

Munson.—Fruit long oval; size medium to large; cavity shallow, abrupt; stem slender; suture nearly obsolete; color bright clear red, with lighter splashes about the stem; dots many, white; bloom white; skin thin; flesh yellow, soft; stone medium size, oval, slightly flattened, cling; quality fair to good; season medium early.

Originated with G. Onderdonk, Texas. Introduced in 1888. One of the very best of the Chicasaws. Hardy, large, productive and excellent. On account of its comparatively large size, its very attractive color, its early ripening and its shapely tree, this is perhaps the best of the Chicasaw plums. It seems not to have gained very general recognition, however. It blossoms at a season convenient for the pollination of most Chicasaw and Wildgoose varieties. Mr. J. W. Kerr regards it as a promising variety for breeding purposes.

Newman.—Fruit medium or large, nearly spherical, sometimes a trifle ellipsoid, not flattened or compressed, tardily ripening to a bright wine red, with some markings of yellow and several white dots, usually with a well-striped suture line; skin thin but tough; flesh firm, meaty, yellow, of medium quality or better; stone rather small, cling. Season medium to late. Tree thrifty, spreading.

"Introduced from Kentucky by W. F. Heikes." One of the best known of the Chicasaws. This and Munson are valuable market sorts. This is an excellent pollenator for Wildgoose.

Ogeeche.—Fruit below medium size, round, red, cling; season early to very early.

Very much like Caddo Chief, Early Red, etc. Found wild in Georgia. Introduced by G. Bourquine.

Piram.—Fruit medium to large, oblong, bright yellow, with white dots and bloom and an indistinct suture line; skin thin; flesh yellow, watery; quality medium or good; cling; season medium. Tree rather small; bark dark-colored; branches

NEWMAN

Leading commercial variety of the Chicasaw group

thorny; leaves small and narrow. Bears young and abundantly.

Originated and introduced by G. Onderdonk, Texas.

POTTAWATTAMIE.—Fruit medium to large, ellipsoid, with a long, slender stem; bright red, with small yellow dots and white bloom and a faint suture line; skin thin, rather inclined to crack; flesh firm, yellow, fine quality, cling. Midseason or a little later.

Originated in Tennessee. Introduced by J. B. Rice of Council Bluffs, Iowa, in 1875. One of the best known Chica-

POTTAWATTAMIE

saws, and deservedly popular. Probably the hardiest of the group. "It will not prove hardy north of the forty-second parallel except in favored spots."—Budd, Iowa Bulletin 19. Professor Goff, in preparing Wisconsin Bulletin 63, received twenty reports of Pottawattamie. These generally called the variety productive and a good seller, but inferior in quality. The name has been diversely spelled, but the spelling here given is correct.

ROBINSON.—Fruit medium size, round, red, cling. Season medium or late.

This is, unfortunately, one of the best known plums of its class. It is distinctly inferior to such sorts as Newman,

Munson, Lonestar, and several others. It is generally reported as rotting badly. Bailey (Cornell Bulletin 38) quotes the following account of its history from Albertson & Hobbs, Bridgeport, Indiana, who introduced the variety in 1884: "This is a seedling grown by a Mr. Pickett of Putnam county, Indiana, from a seedling brought with him from North Carolina, nearly fifty years ago, and has, almost every season (since large enough), borne abundant crops, but was neglected and never brought to the notice of the public till 1879, when Dr. J. H. Robinson (of the same township) read a paper before the Indiana Horticultural society on Chicasaw plums, and gave a very flattering description of this plum, which he had been watching since 1872, and of which he had two good crops on his own trees; which bore two bushels to the tree five years after planting, and has borne good crops annually, except once, when killed by late frosts. It was named by the Putnam County Horticultural society in honor of Dr. Robinson.

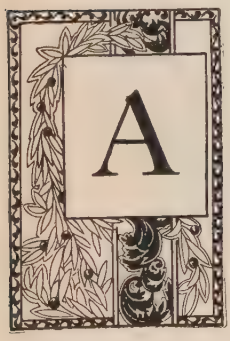
Sanders (Honey Grove).—Described in 1898 catalog of J. S. Kerr, Texas, as small, purplish-red, medium quality, abundant bearer, "the earliest plum." I know nothing more about it.

Yellow Transparent (Transparent, erroneously).—Fruit above medium size, oblong, bright yellow; skin thin and tough; flesh rather soft and watery; flavor sweet and good; stone cling; season early or medium.

Grown from seeds gathered in the wild by J. L. Freeman, northern Texas. A fairly good yellow variety.

XXVI

The Hybrid Plums Named and Described



ALABAMA (Normand No. 5).—Probably a hybrid of Japanese stock with Wildgoose or Chicasaw.

Named by Bailey and described as follows: "Fruit of medium size, round conical or heart-shaped; color light bright red when ripe, with perhaps a faint pinkish cheek, covered with a very thin bloom; flesh soft, sweet and juicy, cling; ripe the 14th of September. The latest of the plums reported in this bulletin. The fruits drop before fully ripe, but developed an excellent quality after they have fallen. On account of its lateness, it is possible that this plum may have commercial value. The habit of the tree is like that of the Georgia."

ALHAMBRA.—Probably Satsuma x Agen (Petite d'Agen, or French Prune); that is, *Prunus triflora x P. domestica.*

Fruit egg-shaped, large or very large; cavity medium shallow, abruptly rounded; suture shallow; apex pointed; color dark dull red; dots many, small, yellowish; bloom thin purplish; skin firm; flesh yellow inside, reddish outside; stone medium to large, flat, pointed, nearly smooth, cling; flavor brisk subacid; quality first-rate.

Originated by Luther Burbank and named by him in 1898. See Vermont Experiment station Bulletin 67:5.

Allfruit (*Prunus simoni x P. triflora*).—Fruit oblate, medium large; cavity deep, rounded; stem short; suture rather shallow; color pale red with many large and small yellowish dots and a thin white bloom; skin medium thick; flesh medium firm, bright yellow; stone medium to large, slightly flattened, semi-cling; flavor sweet and rich; fragrant; quality good to best. Leaf large, oval, pointed, rather finely double crenulate and minutely glandular, rather thick, glistens as if varnished, petiole short, glandular.

Originated by Luther Burbank and named in 1898. See Vermont Experiment station Bulletin 67:5.

AMERICA

America.—Botan x Robinson, Robinson seed, i. e., *P. triflora x P. angustifolia.* Fruit nearly spherical, or a trifle elongated, medium to large, specimens measuring 42 mm. in both longitudinal and transverse diameters; cavity medium depth, abrupt; stem short; suture faint; color bright golden yellow with pink blush; dots many, white, small, indistinct; bloom thin white; skin thin, somewhat astringent; flesh yellow, medium firm; stone large, oval, slightly flattened, cling; flavor not very striking; quality medium to good.

This plum is pretty, but not of large size nor high quality. It partakes very strongly of the Chicasaw parentage. It seems to bear remarkably early. Originated by Luther Burbank and introduced in 1898.

AMES.—*P. americana x P. triflora.* Fruit spherical; size fair; cavity shallow, flaring; stem short, stout; suture very shallow or line; apex very slightly depressed; color bright dark red; dots many, distinct, yellow; bloom thin, blue; skin thick and tough, not astringent; flesh yellow, somewhat Miner-like; stone medium large, round, obtusely pointed, flattened, cling; flavor sweet; quality good. Leaves large, oval, taper-pointed, sharply and somewhat deeply double serrate, dull glabrous above, finely pubescent on the veins underneath, with two conspicuous glands on the strong short petiole.

This variety partakes much more strongly of Americana than of the Japanese characters. Still it shows a pronounced

APPLE

strain of Japanese admixture, especially in shape, color and flavor of fruit. It is very interesting. Originated by J. L. Budd, and will probably be propagated and distributed by the Iowa Agricultural college at Ames.

APPLE.—Japan x Chicasaw, perhaps. Fruit spherical to oblate, large; cavity medium deep, gently rounded; stem short; suture faint; color deep reddish-purple. Foliage large and thrifty, leaves four and one-half inches long, rather narrow oval, tapering below and somewhat abruptly pointed above, margin finely glandular crenulate.

Originated by Luther Burbank, who says that it is a hybrid seedling of the second generation. "No doubt Sat-

suma and probably Robinson are in its line of ancestry." This would mean *P. triflora x P. angustifolia.* It partakes most strongly of the character of Satsuma, especially in the hard, red flesh, though it is very different in other characters. Still there is no obvious showing of the characters of any other species other than *Prunus triflora,* and this may be merely a pure seedling of Satsuma, or of Satsuma crossed with some other Japanese variety.

The fruit is large and attractive and looks so much like a medium-sized apple as to be readily mistaken for one when the apex of the fruit is not visible. The quality is about like that of Satsuma.

BARTLETT.—Delaware crossed with Simon; that is *Prunus triflora x P. simoni.* Fruit ovoid; size medium; cavity deep, rounded; stem medium length, rather slender; suture evident; apex pointed; color dark red; dots many, yellowish; bloom white; skin thin; flesh soft and yellow; stone large. The flavor is said to be very fine, closely resembling that of a Bartlett pear, whence the name. Mr. Burbank says "the tree grows perfectly upright, like a Lombardy poplar, with very glossy leaves, very productive."

BESTOVALL.—Described as a hybrid of Miner pollinated with Abundance, which would be *P. hortulana x P. triflora.* I have seen only the foliage, which is much like Miner, showing no Japanese characters.

Leaves large, coarse, rough, with a tendency toward a faint pubescence on the veins underneath, broadly oval, blunt pointed, base strongly rounded, margins coarsely double serrate, glandless, petioles strong, with one or two small glands. Mr. Munson describes the fruit as "very late, fair size, firm, meaty, fine, sure and prolific."

Originated and named by T. V. Munson, Denison, Texas. See Vermont Experiment station Bulletin 67:7, 1898.

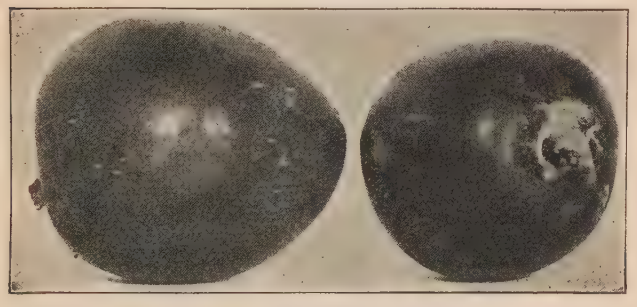
BLACKMAN.—Thought to be a peach-plum hybrid. The evidence of hybridity lies in the sterility of this variety and in its somewhat immediate characters. This is further strengthened by comparison with Mule of J. W. Kerr, which see.

The variety is of no interest except as a curiosity. A full account of it may be found in United States Department Agriculture Report, 1886, p. 261; also in same reports, 1887, p. 636; also in Cornell Experiment station Bulletin 38, 1892, p. 40.

BRECK.—*P. triflora x P. hortulana,* or possibly with *P. angustifolia.* Fruit oblong or slightly conical; size medium; cavity medium deep, rounded; stem very short; suture obsolete; color fine bright red, indistinctly striped; dots many, small, white, inconspicuous; bloom light bluish; skin firm; flesh

medium firm, red, stringy; stone medium large, oval, flattened, cling; flavor sprightly; quality good; has much of the Wild-goose character, but is firmer and better colored. The leaves are medium large, rather broadly oval, blunt-pointed, abruptly tapering below, margins finely crenulate with many conspicuous small glands, petiole short, usually glandless. Specimens from F. T. Ramsey, Austin, Texas. First offered for sale in Mr. Ramsey's catalog for fall of 1899.

CAPER.—*P. triflora x P. cerasifera,* perhaps. Fruit irregular ovoid, medium size; cavity shallow, abrupt; suture shallow; color fine dark red; dots many, minute; bloom light colored; skin thick, tough; flesh medium firm, red; stone large, pointed, only slightly flattened, cling; flavor sprightly subacid; quality fair; leaf large, oval, rounded below, pointed



BRECK

above, rather thin, smooth, fine double-crenulate, petiole, strong and glandular.

Specimens received from the originator, J. S. Breece, North Carolina, in 1899. See Vermont Experiment station Report 12:221. Parentage unknown, except that the fruit and foliage suggest *Prunus triflora* and *P. cerasifera.*

CEL.—Said by Mr. Burbank to be Myrobalan x Wickson; "a tri-specific hybrid." The fruit strongly suggests *Prunus americana* parentage, which would make the pedigree of this variety as follows: *P. cerasifera x P. triflora x P. americana.* Or if we take the view of Wickson suggested on Page 21, the parentage of Cel would be *P. cerasifera x P. triflora x P. simoni.*

Fruit egg-shaped, medium size, rounded cavity; stem medium long and strong; suture indistinct; apex pointed; color bright transparent yellow; stone medium large, cling;

flavor very American-like without astringency; quality good. Leaf quite Cerasifera-like, somewhat cordate, rather sharply though finely double-serrate.

Originated by Luther Burbank and named by him in Vermont Experiment station Bulletin 67:8, 1898.

CHALCO.—Simon x Burbank; i. e., *Prunus simoni x P. triflora.* Fruit strongly oblate, much the shape and color of a tomato, large; cavity medium deep, gently rounded; stem short; suture medium deep; surface smooth; color dark red, solid; dots many, small, indistinct; skin medium thick; flesh yellow, firm and meaty; stone small, oval, only slightly flattened, nearly free; flavor sweet and sugary; quality extra, none of the peculiar Simon plum flavor.

Originated by Luther Burbank and introduced in 1898.

CHICRIGLAND.—Described by the originator as a secondary hybrid combining three species, viz.: *Prunus chicasa x P. rivularis x P. glandulosa.* Fruit described by Mr. Munson as the size of Golden Beauty, fuzzy, rich orange red, stone rounded, appearing woolly, after removal of the flesh; flavor entirely distinct and agreeable. The tree is said to be a strong grower, with zigzag weeping branches. Leaves rather small, elliptical-pointed, rounded or abruptly tapering below, rather thick, rough and harsh, margin finely glandular crenulate, petioles short and minutely glandular.

Originated with T. V. Munson, Texas, from seed of a plum grown by F. M. Ramsey, Lampasas county, Texas, and named in 1898.

CLIMAX (Royal of Van Deman).—Botan pollinated with Simon. *Prunus triflora x P. simoni.* Fruit strongly heart-shaped, very large, as large as an ordinary peach; cavity deep and abrupt; stem short and strong; suture plainly marked, but not deep; apex rounded; color deep dark red; many yellow dots large and small; skin thick, firm; flesh yellow, firm; stone large, somewhat turgid, roughened, free; flavor sweet, rich, fruity; quality fine. Season earliest.

This is justly regarded by Mr. Burbank as being one of his most valuable productions. If, upon extended test, it proves hardy, fruitful and otherwise reliable, it will be an advance, in many respects, upon any plum now known.

COLEUS.—*P. triflora x P. cerasifera,* perhaps. Fruit globular; size small; cavity shallow, abrupt; suture hardly visible; color dark dull deep red; dots hardly visible; bloom bluish; skin thick and tough; flesh medium firm, red; stone small; considerably flattened, cling; flavor flat or a trifle musky; quality poor. Leaf large, broad oval, abruptly acute-pointed, rounded at base, double-crenulate, dark, fine red, conspicuously veined underneath with some pubescence along principal veins.

Specimens from the originator, J. S. Breece. The fruit of this plum is of no value, but the foliage is remarkably fine. It is larger, richer, glossier, more deeply and richly colored than the foliage of any tree of Pissard plum ever seen by the writer. Mr. Breece says that the tree is also a fine grower. It seems probable that this will prove worth propagation as an ornamental plant. Not yet introduced.

Compass Cherry.—Produced from a cross between Miner and Dwarf Rocky Mountain cherry, *Prunus pumila besseyi.* Fruit oval; size small; cavity broad, shallow; stem short, strong; suture a faint line; color dark solid red, or finely spotted; dots minute; bloom not seen; skin thick, tough,

CLIMAX

flesh yellow, rather firm; stone medium size, oblong, somewhat pointed and slightly flattened, cling; flavor rather sour; quality only fair.

Originated by H. Knudson, Springfield, Minnesota, in 1894, and introduced by C. W. Sampson, Eureka, Minnesota, in the fall of 1897. This plum (or cherry) has received a great deal of attention in certain parts of the west, but does not seem to have any special value.

Corymbus.—Fruit heart-shaped; size small to medium; cavity rather shallow; suture shallow; apex pointed; color dark wine red; dots invisible; bloom blue; skin strong; flesh soft, yellow; stone small, round, smooth, slightly flattened, cling; flavor rich, sweet; quality extra.

Said to be "Smelt cherry x Abundance." This plum is evidently of the same parentage as Marble, though different pedigrees are given by the originator. Both are worth propagating. Both suggest Myrobalan. The probable parentage seems to be *Prunus triflora x P. cerasifera.* Received from the originator, A. L. Bruce, Texas.

CULBERSON.—Parentage the same as Marble. Fruit spherical or slightly pointed; size medium to large; color dark, solid red; dots very many, yellow; bloom bluish; skin very thick and tough; flesh yellow; stone small, round, flattened, cling; quality good to best.

DAISY

A fine plum. From A. L. Bruce, Basin Springs, Texas, under name of Mammoth July, but named Culberson by the writer in Vermont Experiment station Report 12:223, 1899. Not yet introduced.

DAISY.—*P. angustifolia x P. triflora.* Fruit heart-shaped; size medium to large; cavity shallow, rounded; stem medium; suture obsolete or nearly so; apex pointed; color the finest bright red; dots many, minute, yellow; bloom light bluish; skin thin but firm; flesh firm, yellow; stone large, oval, pointed, flattened, cling; flavor sprightly, Chicasaw-like; quality good. Leaf small, narrow, tapering at both ends,

thin, smooth, finely and regularly serrate, petiole slender, slightly glandular.

Specimens from the originator, J. S. Breece, North Carolina. Has strongly the appearance of a Japanese-Chicasaw hybrid, the latter species predominating as usual. It is one of the most beautiful fruits yet seen.

Daniel Weeping.—This tree, which I have seen growing in the Cornell university orchards, has the aspect of a hybrid, though no record of its origin is accessible.

The tree is bushy spreading and drooping; leaves thick and tough, ovate, acute pointed, rounded at the base, finely and smoothly crenulate, petioles short and strong with 2-4 glands, stipules often present with younger leaves.

Originated with Dr. Daniel, Louisiana. Sent out by J. L. Normand.

Emerald.—Said by the originator to be *P. triflora x P. americana.* Fruit roundish, large, greenish-yellow, marbled with coppery red; flesh yellowish, translucent, with yellow veins, rather tender, stringy, juicy; mild subacid, almost sweet; good to very good.—Description by W. A. Taylor, Department Agriculture, Washington, D. C.

Tree somewhat resembles a young thrifty Early Richmond cherry; bark on stem of tree is spotted, with cork-like excrescences; buds very conspicuous, large, long, Americana-like; more productive and better for canning than Burbank; hardy and fruitful where Burbank fails in fruit bud. (Theodore Williams.) Originated under cultivation with Mr. Williams by crossing Burbank with Brittlewood, and planted in 1896. Fruit highly spoken of by Professor Craig.

Excelsior.—From seed of Kelsey pollinated by Wildgoose or DeCaradeuc, probably the former. This would be *P. triflora x P. hortulana.* This variety is conspicuously a hybrid. Its character suggests Wildgoose, though a comparison of the blossoming seasons of Kelsey, Wildgoose and DeCaradeuc in Florida would make it seem very likely that the pollen-bearing parent was DeCaradeuc.

Fruit medium or large, flattened, or a trifle pointed like Abundance; no suture; color deep solid wine-red, with very minute, almost invisible, white dots and heavy light-bluish bloom; stem short; skin firm and without astringency; flesh firm, yellowish, with reddish color toward the pit; stone flattened, medium size; quality fine; season June 15 in Florida, July 20 in Maryland. Tree vase form, with long slender branches; leaves rather large, moderately narrow, oval, tapering above, tapering or somewhat rounded at the base, glabrous, margin finely irregular crenulate, with prominent but minute glands, petiole rather short, with 1-3 small glands; flowers small; scattered, white.

Originated by George L. Taber, Glen St. Mary, Florida, in 1887. A promising plum.

FOREWATTAMIE.—Said to be a hybrid between Forest Garden and Pottawattamie, which is *Prunus americana x P. angustifolia.* The foliage and young growth give strong evidence of an unusually equal blending of the two species. I have not seen the fruit.

Leaves oval, tapering at the point and rounded at the base, thin, irregularly double-serrate, with blunt teeth and

EXCELSIOR

inconspicuous glands, slightly tomentous on the veins along the back, petiole rather long and slender, usually with 2-3 small glands. In general the foliage has a softened Miner-like look.

Originated with Theodore Williams, Benson, Nebraska.

FRANKLIN.—*P. triflora x P. angustifolia.* Fruit oblate, medium size; cavity shallow, broad; stem short, strong; suture bright line; color bright crimson over yellow; dots very many, yellow; bloom thin; skin thick and tough; flesh yellow; stone medium size, round, slightly flattened, cling.

Specimens received from the originator, A. L. Bruce, Texas, who calls it "Abundance x Unknown." The fruit looks very much like Golden and has probably the same pedigree.

FRANKLIN

GARNET.—Kelsey x Pissard? Kelsey seed. This would be *P. triflora x P. cerasifera.* The account of its origin given by Heiges is as follsey seed. This would be *P. triflora* under a Kelsey tree. . . . . Its characteristics indicate that it is a chance cross between Pissard that grew near, and the Kelsey under which it grew." This evidence does not seem to have much value of itself.* I have specimens of the foliage, but not having seen the tree and fruit, I must, for the present, consider this variety subject to removal from the list of hybrids.

Heiges gives the following description of the fruit: "Roundish oval, large, smooth, dark garnet red; dots minute, russet; bluish bloom; cavity small, regular, of medium depth, flaring, marked with blue bloom; stem short, of medium caliber; suture very shallow and almost obscure; skin thin, moderately tenacious, bitter; stone medium size, oval, cling; flesh yellowish, translucent, stained with red on one side, mild, almost sweet, good. Season June 25 to 30" (in North Carolina). Leaves round oval, quite broad, abruptly tapering above, tapering or rounded below, roughly double-serrate, slightly glandular margins, glabrous above, slightly tomentous on the mid-nerve underneath, petiole short and stout, with inconspicuous glands or glandless, large, feathery, deciduous stipules.

The history and parentage of this plum are exactly the same as of Coleus. The foliage is much the same and appears to be the most valuable feature of the variety. The fruit resembles Satsuma in color and flesh, but appears to be of small promise. Season early. Has not been introduced to the trade. Mr. Breece says, "The fruit is quite satisfactory, but too sparingly produced."

---

*Several cases have come to light in which hybridity has been suspected on the evidence of reddish-colored foliage. But red-leaved seedlings occur rather frequently without any possible antecedent cross. They are especially common from Kelsey, though not rare from other Japanese varieties. Pissard itself is probably only another such sport, and J. W. Kerr has produced a red-leaved seedling from DeCaradeuc.

GEORGIA (Normand No. 20).—Probably a hybrid of Japanese stock with Wildgoose or Chicasaw. Named by Bailey and described as follows: "Fruit of medium size, but variable,

GOLDEN

oblong, very blunt or sometimes with a cavity at the apex; color green or light greenish-yellow when first ripe, but becoming pinkish, with a very thin nearly white bloom; flesh soft, watery, sweet, cling, with a peculiar breaking skin; ripe

August 24, some days in advance of the Louisiana. The tree has the habit and fruit of the Louisiana, but that plum is more distinctly heart-shaped. In common with others of these hybrids, Georgia drops when it is still green in color, although it is edible at that time, and a pinkish color appears if it is allowed to lie on the ground. The tree is a spreading, twiggy grower, with slender, glossy, half-zigzag branchlets and foliage suggestive of some of the native plums."

GOLDEN (Gold, of Stark Brothers).—Robinson x Botan, Robinson seed; i. e., *Prunus angustifolia x P. triflora.* Fruit round or oblate, medium to large; cavity medium deep, rounded; stem short; no suture; color bright golden yellow, overlaid when fully ripe with a fine pink blush, very pretty; dots many, yellow, very dim; bloom thin, white; skin thin but strong; flesh rather soft and watery, yellow; stone medium or small, oval, but little flattened, strongly keeled, cling; flavor sprightly; quality good. Season July 15 to August 1. Tree dwarfish, rather Chicasaw-like in general appearance, leaves small or very small, narrow, oval, tapering above, tapering or unequally rounded at base, the upper surface glabrous, slightly tomentous underneath, especially along the veins, margins irregularly dull, crenulate, glandular, petiole short, rather stout, with 2-3 small glands.

The Chicasaw parentage preponderates in this variety, as in many others of its class. The characters which are not plainly Chicasaw are mostly anomalous, there being very little apparent evidence of Japan parentage. An interesting variety and worth a trial. The fruit is handsome and ships well, but is inclined to ripen unevenly and to drop before ripe. The tree is a good grower, and seems to be comparatively hardy. It has stood the winters here in Vermont in almost perfect condition, though several of the Wildgoose and Wayland varieties suffered considerably.

This variety has sometimes been confused with Juicy, but the two are altogether distinct, as may be seen from a comparison of the figures and descriptions here given.

Mr. Burbank has sent me several very promising seedlings of Golden.

GONZALES.—Fruit large, about the size and shape of Burbank, nearly spherical, sometimes a little irregular, and occasionally slightly pointed; bright, wine red, indistinctly striped and splashed with deeper crimson, with many small, yellowish dots; bloom white; skin moderately thick and firm, not harsh nor astringent; flesh rather firm and meaty, light red, sweet and pleasant; stone medium size, oval, flattened, cling; quality first-rate. Leaves narrow, oval, tapering almost equally at both ends, margin finely crenulate and minutely glandular, surface glabrous above, a few small, fine hairs on

GONZALES

the mid-nerve at the back, petiole rather short and slender, with usually two small glands.

Originated in Gonzales, Texas, about 1894, and introduced by F. T. Ramsey in 1897. A very promising plum.

GOVALLE.—*P. triflora x P. angustifolia,* probably. Fruit oblong, medium size; cavity shallow; stem short, strong; suture obsolete; color bright red; dots many, fine, white; bloom bluish; skin thin; flesh a trifle soft, stringy; stone medium large, flattened, cling; flavor sprightly subacid; quality good, season early. Leaf medium size, oval, pointed at both ends, thin, light green, very minutely glandular serrate, petiole short. Originated in Texas and introduced by F. T. Ramsey in 1898. Thought to be a seedling of Kelsey.

GRAYSON.—*P. hortulana x P. americana,* perhaps. Fruit irregularly spherical; size medium; cavity medium deep; suture a line; apex slightly indented; color clear red; dots many, yellow, conspicuous; bloom heavy, white; skin medium thick; flesh yellow, rather soft; stone medium size, oval, slightly flattened, cling; quality good. Season after Wildgoose. Leaf large, oval, rough, very finely pubescent underneath, rounded below, tapering above, double crenulate-serrate, petiole glandular.

The twigs and foliage are Americana-like, except the margins of the leaves; the fruit is intermediate between Wildgoose and Wayland. An odd and interesting plum. Received from F. T. Ramsey, Austin, Texas. Introduced in 1898 by Mr. J. S. Kerr, who writes that this is "from the seed of Wildgoose probably fertilized with our native wild plum" (*P. americana?*) Originated with A. L. Bruce, Basin Springs, Texas, about six years ago.

HALCYON.—*P. triflora x P. angustifolia,* probably. Fruit heart-shaped; cavity deep, rounded; stem stout; suture shallow; color bright red; dots few or none; skin thin; flesh yellow; stone large, oval, winged, cling. Leaf medium size, narrow, pointed at both ends, thin and smooth on both sides, minutely crenulate-serrate, petiole with small glands.

Originated with J. S. Breece, North Carolina, who does not regard it highly and who will not propagate it.

HOLLAND.—From Kelsey seed, supposed to be crossed with Lonestar. This would be *Prunus triflora x P. angustifolia.* Fruit size and form of Abundance, greenish-yellow splashed with red; flesh moderately firm and juicy, vinous, adheres slightly to stone. Season late June in Texas.

Tree vigorous, of rather compact, stocky habit, leaves medium large, ovate or lanceolate, tapering at both ends, thin, flat and glabrous, margins finely glandular-serrate, petioles medium with occasional small glands.

Originated by D. H. Watson, Brenham, Texas, and introduced in 1897 by W. A. Yates.

JUICY.—A seedling of Robinson pollinated with Botan. *Prunus angustifolia x P. triflora.* Fruit irregularly ellipsoid, medium size; cavity medium deep, rounded; stem medium long, strong; color clear yellow; many indistinct white dots and a thin white bloom; skin thin; bloom thin, white; flesh yellow, rather soft and watery; stone medium large, flattened, pointed, cling; quality fair to good. Season last of July.

JUICY

Tree a strong, rampant, upright grower; leaves medium to large, ovate, taper-pointed, rounded at the base, glabrous, margins finely serrate, petiole rather short, with small glands.

Originated by Luther Burbank, and first offered in 1893. Introduced by John Lewis Childs in 1894.

LANNIX.—Thought to be a cross of Abundance and Wildgoose. The following description from Heiges plainly suggests Wildgoose, but does not indicate the participation of Abundance.

"Fruit oval, medium size; color coppery red, a little darker than Wildgoose; dots minute, light russet; bloom light blue; cavity medium size, round, deep, abrupt; stem short; suture very shallow; skin thin, tenacious, bitter; stone large, oval, cling; flesh yellowish-translucent, slightly fibrous; flavor mild subacid, rich; quality good. Season (in North Carolina) June 20-25." Leaf rather large, oval, pointed, rounded at the base, rather leathery in appearance, smooth on both sides, margin finely crenulate-serrate, glandless, petiole short and stout, usually glandless.

Late Conical.—*Prunus triflora x P. simoni.* Fruit strongly conical, rather large; cavity shallow, abrupt; stem short; suture shallow; color red and purplish over yellow; dots many, large, yellow; bloom heavy, purplish; skin medium thick; flesh yellow, solid, firm; stone medium size, flattened, pointed, free; flavor sweet and agreeable; quality superfine. The finest quality of any plum yet examined, though Mr. Burbank thinks this is not a fair comparison. Tree a rapid grower, form of Burbank. Leaves medium to large, broadly oval, abruptly pointed, tapering at the base, rather stiff, margins rather coarsely double-crenulate, petiole large, set with glands.

Originated by Luther Burbank and named by him in Vermont Experiment station Bulletin 67:16, 1898.

Louisiana.—*Prunus triflora x P. hortulana* or *P. angustifolia.* Fruit irregularly ovoid, medium to large; cavity shallow, rounded; stem medium; visible suture; color greenish overlaid with dull red: dots many, large, whitish; bloom thick, white; skin medium thick; flesh yellow, stringy; stone large, oval, flattened, cling; flavor sprightly subacid, good; quality fair. Season September 1. Tree a slender and spreading grower, strongly suggesting Wildgoose, leaves medium size, tapering at both ends, very finely glandular-crenulate, glabrous, petioles glandular. This variety has the bad habit of ripening unevenly and dropping from the tree before maturing. It has proved hardy thus far at Ithaca, New York.

Sent out by J. L. Normand, named by Professor Bailey in Cornell Experiment station Bulletin 139:377, 1897.

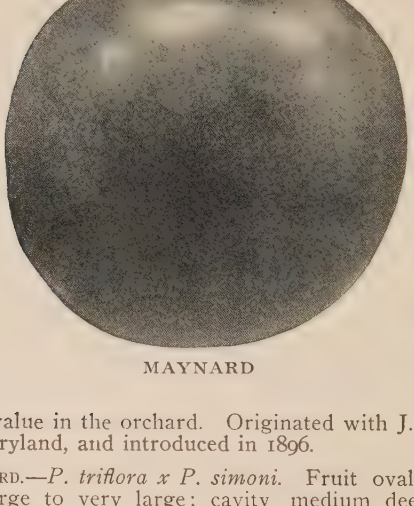
Marble.—Fruit heart-shaped, small; cavity medium deep; suture shallow; apex pointed; color dark wine red; dots invisible; bloom blue; skin tough and medium thick; flesh yellow; stone small, oval, slightly flattened, cling; flavor rich and sweet; quality excellent. An odd and very interesting plum of high quality.

Said by the originator, A. L. Bruce of Texas, to be a cross of Weaver with Crimson Beauty; but Mr. Bruce's Weaver

seems to be certainly Miner. Crimson Beauty belongs to the Wayland group.

Twenty or thirty other varieties of the same or very similar parentage were received from Mr. Bruce.

MARYLAND.—A seedling of Utah Hybrid, which see. *Prunus angustifolia watsoni x P. pumila besseyi.* Fruit round or slightly ellipsoid, small, dark red or maroon; stone medium size, pointed, cling. Season July 15-25 (in Maryland). Leaves large, oval, pointed, rounded at the base, thickish, harsh, smooth above, tomentous below, margin irregularly crenulate and minutely glandular, petiole short, strong, with 2-3 prominent glands.



MAYNARD

Of no value in the orchard. Originated with J. W. Kerr, Denton, Maryland, and introduced in 1896.

MAYNARD.—*P. triflora x P. simoni.* Fruit oval, obliquely truncate, large to very large; cavity medium deep, broad; stem medium length; suture obsolete; color deep dull red; dots very many, minute; bloom thin, whitish; skin thin; flesh yellow, reddening from the outside, meaty; stone medium large, oval, flattened, roughened, perfectly free; flavor rich and sweet, quality extra fine. Originated by Luther Burbank and named by him in Vermont Experiment station Report 12:226, 1899. Named after Professor S. T. Maynard. A very fine plum.

MINNIE.—Probably Abundance pollinated with Wildgoose. *Prunus triflora x P. hortulana.* Leaf very much like Abundance, large, slightly obovate, abruptly pointed, rounded at the base, smooth on both sides, margin irregularly double-crenulate-serrate, with occasional small glands, petiole short and stiff, with several glands.

Originated with J. S. Breece, North Carolina, and named in 1898. Not yet introduced.

MONOLITH.—"It appears to be intermediate between Botan (Abundance) and Wildgoose." This variety has exactly the same standing as Lannix and like that variety appears from the description to show strong Wildgoose characteristics without a corresponding balance of Japanese marks.

Heiges describes the fruit as follows: "Roundish, slightly conical, medium size; bright coppery red, with longitudinal stripes of darker red; dots numerous, minute, russet; bloom profuse, pale blue; cavity medium in size and depth, round, flaring; stem slender; suture very shallow; skin thin, tenacious, bitter; stone medium size, oval, semi-cling; flesh yellowish, translucent, meaty, tender, juicy, somewhat fibrous; flavor mild subacid, rich; quality good to very good. Season July 15 (in North Carolina)."

Originated with J. S. Breece, Fayetteville, North Carolina. Named in 1895, but not yet introduced.

MULE (of J. W. Kerr).—Troth Early Peach crossed on Wildgoose plum. An authentic hybrid. Tree with very much the form of Wildgoose plum, but looking more like a peach on account of the peach-like foliage. Twigs and leaves quite peach-like, the latter, however, rather broader and stiffer than peach leaves, sharply tapering at the point, rounded at the base, margin sharply and irregularly appressed glandular crenulate, petiole short and stiff, with three to six glands. The tree forms flower buds which never blossom. They contain deformed anthers, but no pistils. The variety is therefore perfectly sterile.

NIKKO.—Parentage unknown, but probably Satsuma on one side. I have not had the opportunity to examine this variety, which is characterized as a good dark red, red-fleshed, conical plum.

Originated by Burbank and first offered for sale in 1898.

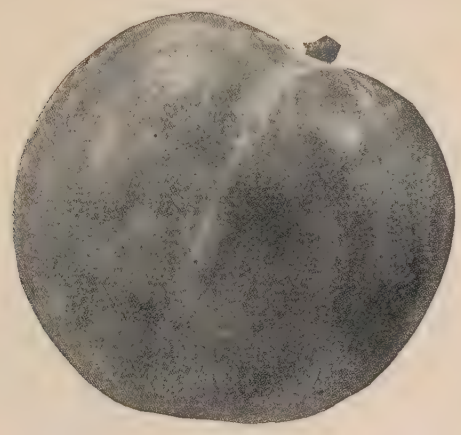
NONA.—*P. triflora x P. angustifolia*, probably. Fruit oval, slightly pointed; size medium; cavity abrupt; stem medium; suture scarcely visible; apex slightly pointed; color dark red, slightly striped; dots many, yellow, large and small; bloom light, bluish; skin thick, firm, a trifle bitter; flesh reddish-yellow, a little stringy; stone medium size, round, slightly flattened, cling; flavor sprightly subacid, quality fine.

NONA

A good-looking early market plum, somewhat the size and form of Wildgoose, but firmer, darker and more pointed.

Specimens received from F. T. Ramsey, Austin, Texas. This plum belongs to the same series as Holland and Yates. Originated with D. H. Watson, Brenham, Texas, and introduced by W. A. Yates, 1897.

OCCIDENT (Sultan of Burbank).—*P. triflora*, perhaps crossed with some undeterminable species. Fruit nearly spherical, very large; cavity medium deep; stem short, stout; suture shallow; color rather dull red over greenish; dots many, yellow; bloom blue; skin medium thin; flesh dark red; stone medium large, round, turgid, rough, winged, free.



OCCIDENT

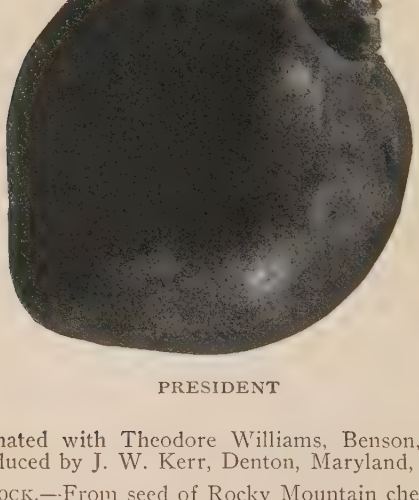
Specimens received from the originator, Luther Burbank, California. It is a fine, large, long-keeping fruit, with flesh strongly suggesting Satsuma. Does not seem to be different in any important particular from Apple, which see. The name Occident was substituted for Sultan by the writer because the latter was previously occupied. See Downing, Fruits and Fruit Trees, Appendix, p. 157, 1876.

OLLIE.—Wayland x Wildgoose, according to Mr. Bruce. Fruit oval; size medium; cavity shallow; suture faint line; color dark red; dots invisible; skin rather thin; flesh yellow, with some reddish lines; stone medium size, round, flattened, cling.

Fruit received from the originator, A. L. Bruce, Basin Springs, Texas. Does not appear to be of value.

PENDENT.—Said to be from seed of Pottawattamie pollinated by Forest Garden. This would be *P. angustifolia x P. americana.* I have seen only the leaves and these seem to be intermediate between the supposed parents.

Leaves medium large, long, ovate, taper-pointed, rounded at the base, rather stiff and harsh, especially harsh on the under side, margin medium, finely double-serrate, with an occasional minute gland, petiole slender, usually with two small glands.



PRESIDENT

Originated with Theodore Williams, Benson, Nebraska, and introduced by J. W. Kerr, Denton, Maryland, 1898.

PENNOCK.—From seed of Rocky Mountain cherry thought to be pollinated with Arctic. This would be *Prunus pumila besseyi x P. domestica.* The meager specimens which I have examined show a preponderance of the cherry characters, but also suggest *P. domestica* in some respects.

Mr. Pennock describes the fruit as follows: "Nearly round, about an inch in diameter, deep blue in color with a bloom, having a slight suture, flavor between a plum and cherry, excellent to eat out of hand or for preserves or canning; tree of dwarfish growth, but upright. Was raised from seed planted in 1893." The leaves are medium size, ovate, tapering at both ends, rather coarsely serrate, flat and thickish,

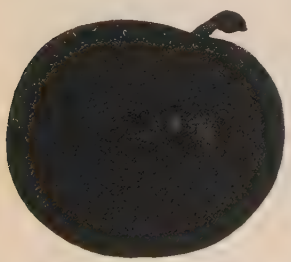
with some fine tomentum on either side, petiole short and stiff, occasionally a small gland at the base of blade. The stone is small, round and cherry-like.

Mr. Pennock, Fort Collins, Colorado, the originator, says he now has Early Richmond cherry and Arctic plum growing nicely on the same stock of this variety. He has thus far found it a very useful stock for plums.

PRESERVER.—Probably a cross of Kelsey with Early Red, Kelsey seed. This would be *Prunus triflora x P. angustifolia.* Fruit dark red; flesh red, firm. Season June (in Texas). Tree vigorous, compact, leaves small, lance-ovate, tapering at both ends, thin, flat and glabrous, margins finely glandular serrate, petioles rather short and slender, with occasional small glands.

Originated with D. H. Watson, Brenham, Texas, and introduced by W. A. Yates in 1897.

PRESIDENT.—*P. triflora x P. simoni;* seedling of Wickson. Fruit heart-shaped, large or very large; cavity deep, rounded; stem short, very stout; suture shallow; apex pointed; color dark, fire red; dots many, minute; bloom thin, blue; skin thin; flesh firm, meaty, yellow; stone large, oval, pointed, flattened, semi-cling; flavor peculiar, a trifle like muskmelon; quality poor to fair in the specimens examined, though said by Mr. Burbank to be much superior to Wickson.



RAGLAND

Grown by Mr. Burbank, California; named by the author in Vermont Experiment station Report 12:229, 1899.

PRESLEY.—Probably Miner x Wayland. Fruit slightly oval, medium size; cavity shallow; suture a line; color bright red; dots many, indistinct; bloom thin; skin thick and tough; flesh yellow; stone small, round, flattened, cling; quality good.

Specimens received from the originator, A. L. Bruce, Basin Springs, Texas.

RAGLAND.—Fruit oblate, size medium; cavity broad and rounded; stem medium long, strong; sature none; color bright clear yellow; dots many, yellowish; bloom white; skin rather thin; flesh yellow, firm; stone small, round, flattened, cling; flavor sweet and rich; quality extra.

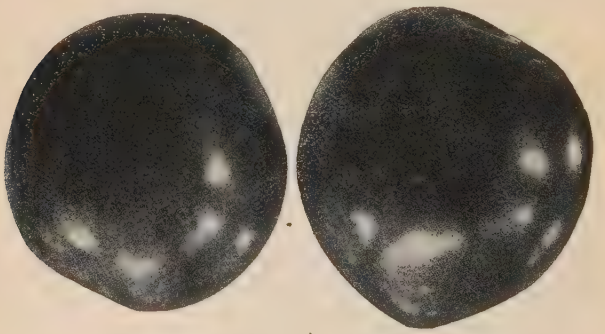
Early and fine, but the yellow color is against it for a

market plum. Originated with D. H. Watson, Brenham, Texas, and introduced by W. A. Yates in 1897. Parentage probably the same as Holland, Nona and Yates.

Ray.—Miner x Wildgoose, perhaps. Fruit oval to spherical; size small to medium; cavity medium deep; suture faint line; color dark red; bloom blue; skin medium thin; flesh yellow; stone small to medium, round, slightly flattened, cling.

Specimens received from the originator, A. L. Bruce, Basin Springs, Texas. Does not seem to be of value.

Red May.—*P. triflora x P. hortulana.* Specimens of this plum have not been examined. The following account is taken from the catalog of the introducer: "The fruit is larger than that of Wildgoose, oblong, pointed, covered all over with



RUBY

deep red, very similar to Red June in size, color and shape, but five to ten days earlier, more prolific and the tree much more vigorous, according to fair tests in 1896 and 1897; resembling Abundance in growth, blooms rather late, between Botan and Ogon; ripens May 25 to June 10. . . . From seed of Abundance fertilized by Wildgoose."

Originated with A. L. Bruce, Basin Springs, Texas, and introduced by J. S. Kerr, Sherman, Texas, 1898.

Ruby.—*P. triflora x P. hortulana.* Fruit heart-shaped, medium size; cavity shallow; stem short; suture very faint line; apex pointed; color dark, fine wine red; dots very minute; skin thick; flesh yellow, firm; stone large, oval, pointed, flattened, cling; flavor sweet and rich; quality good. Leaf oval, pointed, rather thin but harsh, margin very finely crenulate, petiole sub-glandular. Partakes strongly of *Prunus*

triflora characters. A promising plum. Received from the originator, J. S. Breece, Fayetteville, North Carolina, who writes: "Ruby is quite successful in every way, except its lack of quality." Quality seems to me to be above the average. Not yet introduced.

SATIN.—*P. hortulana x P. triflora.* Fruit round oval; size medium; cavity medium; suture a line; color red; dots many, large, yellow; bloom white; skin thick and very tough; flesh very firm, yellow; stone medium size, oval, slightly flattened, cling; flavor Americana-like; quality good. Leaf oval, long-pointed, thin, green, wholly glabrous, margin finely and evenly serrate, petiole glandular.

Thought to be a hybrid of Moreman and Japanese. Promising. Specimens received from the originator, J. S. Breece of Fayetteville, North Carolina.

SCRIBNER.—*P. hortulana x P. triflora.* Fruit oval, large; cavity large, rounded; stem short, strong; suture faint line; color dark fine red; dots many, small, indistinct; bloom heavy, light bluish; skin firm; flesh medium firm, meaty, yellow; stone large, flattened, cling; flavor none; quality extra poor.

Specimens received from the originator, J. S. Breece, North Carolina, who says: "Not productive, not good quality, rejected."

SHIRO.—*P. angustifolia x P. cerasifera x P. triflora x P. simoni,* according to Burbank. That is Robinson x Myrobalan x Wickson. Specimens not seen. Described as bearing "in the utmost profusion, fruit medium to large, very uniform in size, clear light yellow, with an almost imperceptible thin, white bloom, and so transparent that the pit can be seen through the flesh, which is firm, yet juicy, rich, pleasant subacid, clingstone; ripens two weeks before Burbank."

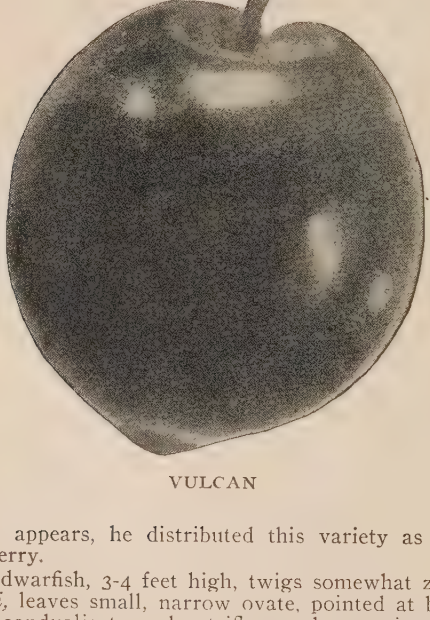
Originated by Luther Burbank and first offered in New Creations, 1899, 11.

SIROCCO.—Said to be a probable cross of Abundance and Marianna. The fruit is described by Heiges as follows: "Roundish oval, medium size; coppery red under streaks of yellow; dots minute, light russet; bloom light blue; cavity small, very shallow, abrupt; stem short, slender; suture a trace; skin thin; stone medium size, oval; flesh reddish-yellow near the skin and yellow near the stone, fine grained, very juicy, sweet subacid, quality good. Season middle July (in North Carolina)."

UTAH HYBRID (Cherry).—Bailey decided in 1894 that "all botanical evidence goes to show that this plant is a hybrid of *Prunus besseyi* (the Rock mountain dwarf cherry) and the sand plum, *P. watsoni,*" and he gave the following botanical

details bearing out this supposition. This plant has been named *Prunus utahensis* by Dr. Dippel (Laubholzkunde 3:634, 1893).

The Black Utah Hybrid cherry originated with J. E. Johnson at Wood river, Nebraska, on or near the Platte river, probably sometime in the sixties. Mr. Johnson grew native dwarf cherries and sand plums in his garden. Seeds of these cherries were sown. One of the seedlings was saved and propagated. Mr. Johnson soon afterward moved to Utah,



VULCAN

whence, it appears, he distributed this variety as the Utah Hybrid cherry.

Plant dwarfish, 3-4 feet high, twigs somewhat zigzag like *P. watsoni,* leaves small, narrow ovate, pointed at both ends, somewhat conduplicate and a trifle rough, margins crenulate, glandless, petioles medium short, occasionally with small glands, fruit small, spherical, cherry-like, but with a plum-like bloom; stone round, cherry-like.

This hybrid has not proved to be of any practical value, except perhaps in rare circumstances. One of the best of the class is Mr. Kerr's seedling, Maryland, which see.

VIRGIE.—Said to be Miner x Crimson Beauty. Fruit nearly spherical; size medium; cavity very shallow; suture a line; color deep crimson; dots many, yellow; skin thin; flesh yellow; stone small, round, slightly flattened, cling; quality good.

Belongs to the same series as Marble. Originated and named by A. L. Bruce, Texas.

VULCAN.—*P. triflora x P. simoni*, probably. Fruit oval, the two halves unequal, very large; cavity large, abrupt; stem short, very stout; suture deep at top, ends in a line; apex pointed; color purple, shaded into black; dots many, yellow; bloom blue; skin tender; flesh red at outside, shaded to yellow at center; stone large, elliptical, slightly flattened and winged, cling; flavor pleasant, sweet; quality excellent.

Originated by Luther Burbank, and not yet introduced. A fine, large fruit, something after the character of Wickson.

WATSON.—Probably a hybrid; from Kelsey seed, thought to be pollinated by Lonestar. This would be *Prunus triflora* x *P. angustifolia*. Fruit large, rather pointed, red when fully ripe; flesh yellow, juicy, melting, adhering slightly to the pit, which is small. Tree vigorous, of somewhat open habit, leaves medium to large, ovate-lanceolate, taper-pointed, tapering or slightly rounded at the base, thin and glabrous, margins finely serrate with minute glands, petiole short, sometimes with small glands. Said by the introducer to be very prolific and valuable.

ZULU

Originated with D. H. Watson, Brenham, Texas, and introduced by W. A. Yates, 1897.

WICKSON.—*P. triflora x P. simoni*. Fruit heart-shaped; size large to very large; cavity abrupt; stem very short and stout; suture usually medium; apex pointed; color dark red; dots many, yellow; bloom thick, bluish; skin firm; flesh yellow, solid, meaty; stone large, oval, slightly flattened, cling; flavor sweet; quality good, season medium.

This variety has been extensively planted in the eastern states, considering its newness. It is now in bearing in many orchards. It is a beautiful, large plum, but shows signs of being a light bearer. The tree is a strict, upright grower, like *Prunus simoni*, and not of good form for bearing heavy crops. It is generally hardy as far north as Rochester, New York. Originated by Luther Burbank.

YATES.—Probably a hybrid; from Kelsey seed thought to be pollinated by Lonestar. This is *Prunus triflora x P. angustifolia.* Very much like Holland, from which we need not distinguish it here. Originated with D. H. Watson, Brenham, Texas, and introduced by W. A. Yates, 1897.

ZULU.—Parentage undeterminable. Fruit round, or somewhat oblate; size medium; cavity broad, open; stem short, strong; suture shallow; color very dark dull red, almost black; dots many, minute, whitish; bloom blue; skin thin and tender; flesh firm, juicy, red; stone medium large, rounded, only slightly flattened, cling; flavor rich and sweet; quality good to best. Leaf large oval, abruptly acute pointed, margin coarsely double-crenulate.

An early plum of high quality, but not so promising as a shipping or market variety. Produced by Luther Burbank, who says regarding its parentage: "It is a mystery, being three or four generations from innumerable crosses, and resembles no other known species or variety." Not yet introduced.

XXVII

Miscellaneous and Unclassified Varieties Named and Described

ALPHA—A variety of *Prunus maritima* selected from the fields of New Jersey, where this species grows abundantly wild, and sent to J. W. Kerr of Maryland by E. W. Winsor. Named by Mr. Kerr and said to be of large size and quality.

ANDERSON (Anderson's Early Red).—"A young and regular bearer; fruit medium size, quality medium; season August 10-20. Found along the river near Sioux Rapids, Iowa."—Goff, Wisconsin Bulletin 63.

BASSETT (Bassett's American).—Fruit spherical or slightly oblate; size small, about five-eighths inch in diameter; cavity shallow; stem short; suture a line; apex slightly depressed; color reddish over a green ground; dots minute; bloom blue; skin tough; flesh yellow; stone circular, smooth, slightly flattened, free; quality fair; season medium late.

The best known named variety of *Prunus maritima* in cultivation.

Beta.—Said by J. W. Kerr to be a distinct yellow variety of *Prunus maritima,* collected in New Jersey by E. W. Winsor.

Bluemont.—A variety of the Watsoni group, which originated some years ago at Manhattan, Kansas, and still grown locally in a small way. It has recently been favorably reported to me by William Cutter of Junction City, Kansas, who says that it has usually been propagated by suckers.

Brill.—A variety of southern origin, thought to have come from Mississippi, and grown to some extent in Texas. Introduced to the nursery trade by J. T. Whitaker, Tyler, Texas. Myrobalan.

Cherry (or Early Cherry).—The whole Myrobalan species is commonly called the Cherry plum, especially in Europe. This is recognized in the scientific name, *Prunus cerasifera,*—"the cherry-bearing plum." The name Cherry was recognized by Downing and all our early pomologists as a synonym of Myrobalan, which, as elsewhere explained, is to be regarded as a class name rather than as a variety name. Two or three varieties of the Myrobalan group, however, continue to be grown in various parts of the country under the name of Cherry, Early Cherry, etc. Such names are illegitimate.

Chippewa.—A dwarf variety from Chippewa Falls, Wisconsin, mentioned in Iowa Bulletin 19:554.

Cook.—Listed in the Marianna (Myrobalan) group by J. W. Kerr, and described as "medium size, round, inclining to oblong, red, cling."

Couler.—"The Couler is a large plum of fair quality, ripening a little before Miner, but sometimes cracks open badly before ripe."—O. H. Kenyon, McGregor, Iowa, horticultural report 27:235. From William Couler, Chicasaw county, Iowa. The variety seems to have been left behind in the progress of native plum breeding in Iowa.

De Caradeuc.—Fruit globular, medium size, with a prominent suture line, deep purplish-red, with a thin bloom; skin thin; flesh soft, juicy, yellow; stone medium size, roundish, turgid, cling; quality only fair; season early; tree a rather large and erect grower. Bailey gives the following history of the variety: "About a year ago I became convinced that De Caradeuc is *Prunus cerasifera,* and I was glad to have my opinion confirmed by so good a nurseryman as P. J. Berckmans of Georgia, who named the variety; and the origin of the plum, which I have since learned, corroborates my conclusion. It originated with A. De Caradeuc upon his former farm near Aiken, South Carolina, about the years 1850 to 1854. Mr. De Caradeuc imported some French plums, from the seed of which this variety came. There were several Chicasaw plums in the vicinity of the French trees and Mr. De Caradeuc

thinks that the variety under consideration is a hybrid, but I am unable to discover any evidence of hybridity. The original tree of the variety 'outgrew the parent and reached a diameter of head of fifteen feet, was entirely free from thorns and suckers, and bore a remarkably rich and beautiful foliage.' The variety blooms very early, some days ahead of the Marianna, and the flowers, as in all varieties of *P. cerasifera,* are somewhat scattered and less abundant than in the native species."—Cornell Experiment station Bulletin 62:36, 1892.

Diamond.—A variety under this name is mentioned by John A. Hogg in Nebraska Horticultural Report 121, 1890. The name doubtless belongs to the variety of the Domestica group described elsewhere in this book. Probably the variety is now extinct and need not be renamed.

Dwarf Rocky Mountain Cherry.—The variety introduced several years ago under this name by Charles E. Pennock of Colorado has received a good deal of notice. The interest in it arises chiefly from the fact of its novelty. It does not seem to have any general merit as a garden fruit. It is the best known representative of *Prunus pumila besseyi* in cultivation. The tree is dwarf, four feet high, bushy, and subject to the attacks of the twig blight (monilia), but otherwise hardy. The fruit is small, oval, black, rather sour and puckerish. Mr. Pennock has been using this variety in hybridization with promising results.

Ebon.—Put into the Marianna (Myrobalan) group by J. W. Kerr, who describes it as follows: "New, medium size, round to round oblong; skin very dark red; flesh red, cling; tree a free upright grower, with distinct foliage."

Ellis.—"Rather large, round, red, skin very thin, semicling. Ranks high for market or for home use. Late. Said to be a cross between Wildgoose and Golden Beauty. Northern Texas. Introduced by T. L. Ellis."—Bailey. It seems strange that a variety worthy of so much praise should not have been heard from since 1892.

Fawn.—Fruit irregular spherical; size medium; cavity medium, rounded; stem slender; suture a line; color dull red; dots many, large, yellow; bloom apparently none; skin thick, tough; flesh yellow; stone medium size, oval, only slightly flattened, cling; quality fair to good.

Specimens from J. W. Kerr, Maryland.

Frostproof.—Fruit spherical, small, cherry-like; deep, dark crimson, with a fine suture line and many very minute dots; skin medium thick and firm, not astringent; flesh yellow, more or less streaked with red, notably firm, even when overripe, meaty, sweet, pleasant; quality good; stone small, round, smooth, cling; season last of June in Missouri.

Originated and introduced by J. H. G. Jenkins, Spring Garden, Missouri, about 1896. Myrobalan group.

FULLER (Fuller's Egg).—Named to Professor Goff by B. A. Mathews of Knoxville, Iowa.

CRABLE.—Fruit obovate; size medium; cavity very shallow; stem long, slender; suture a line; apex pointed; color orange with crimson blush; dots very many, minute, white; bloom blue; skin very tough; flesh yellow; stone large, elliptical, slightly winged, cling; quality good.

Specimens received from Iowa. Probably *Prunus americana.*

HATTIE.—Fruit round, small, red; flesh yellow, soft; stone small, round, cling; quality poor; season early; tree dwarfish.

Nobody seems to know the history of this variety, and probably nobody wants to. Myrobalan group.

HOSKINS.—"Productive, regular bearer, medium; ripe September 1-10; good quality, good shipper, golden color, freestone, with thin, tough skin." Described by the introducer, J. Wragg & Son, Waukee, Iowa.

IOLA.—A variety originated by D. B. Wier, Illinois, and mentioned by Bailey, Cornell Bulletin 38. Not grown now.

ITHACA.—Mentioned by Bailey (Cornell Bulletin 38) and said to have come from Peter M. Gideon, Minnesota. Not known now.

KICAB.—Fruit roundish oval; size medium; cavity small; stem short, slender; suture very shallow; color crimson with purplish stripes radiating from the cavity; dots numerous; bloom heavy, lilac; skin thick, tenacious; flesh tender, yellow; stone large, oval, cling; flavor mild subacid; quality good to very good; season August 10-15 in Illinois.

Seedling raised by Benjamin Buckman, Farmingdale, Illinois. Description taken from United States Pomologist's Report, 1895, p. 45.

MARIANNA.—Fruit round; size small to medium; cavity shallow; stem short; suture a line; color bright, clear red; dots many, small; bloom thin, white; skin thin; flesh very soft and watery, yellow; stone large, oval, somewhat flattened, cling; flavor peculiar, like sugar and water, without much sugar; quality poor; season early.

Originated in the orchard of Charles G. Fitze at Marianna, Polk county, Texas. Introduced in 1884 by Charles N. Eley, Smith Point, Texas. Belongs in the Myrobalan group, though perhaps hybridized with some Chicasaw variety.

MILES.—"Said to have originated in Illinois from seed taken from North Carolina."—Bailey.

Mirabelle.—This is one of the oldest varieties known in Europe, belonging probably in the same group with the Myrobalan. It is not much known in this country, but specimens grown in Iowa by J. L. Budd are described as follows by Craig: "Form oblate, flattened laterally; size small, cherry-like, sometimes two-lobed; cavity quite large; suture outlined; apex depressed; surface smooth, not shiny; color yellow; dots toward stem end, red; bloom very thin, lilac; skin thin, tough; flesh fairly firm; stone small, oval, perfectly free; flavor sweet, melting; quality good to best."

Monona.—"A plum grown by Mr. Christian Steinman of Mapleton, Iowa, reported to be the size of Miner, ripening two weeks earlier, and to have been very profitable; blooms about three days later than Miner."—Goff.

Okaw.—Named in Bailey's Annals of Horticulture, 1890:175.

Parker.—"Reported as very productive and regular in bearing, large size, good quality and early, by Mr. Wedge of Minnesota, who considers it very promising."—Goff.

Pearl.—Fruit oval, somewhat flattened; size medium; cavity very shallow; stem slender; suture a line; color red over orange, sometimes spotted; dots minute; bloom blue; skin medium thick; flesh tough; stone medium size, round oval, slightly flattened, nearly free; quality fair; season medium late.

Fruit received from J. W. Kerr, Denton, Maryland.

Piper (Piper's Peach).—A Minnesota variety, and highly spoken of by a few growers in that state.

Potter.—Originated in Cherokee county, Iowa. Probably an Americana.

Purple Panhandle.—Another of the same lot with Red Panhandle and Yellow Panhandle, but not mentionably different from them as far as fruit is concerned. Tree rather small, but a rapid grower. One of the Watsoni group.

Rareripe.—"A dark red plum, a little smaller than De Soto, but inferior to Harrison's Peach. Hardy."—Keffer, South Dakota Bulletin 26. Probably not propagated at present.

Red Panhandle.—Fruit irregular oval; size small, about three-fourths inch in diameter; cavity shallow; stem slender; suture a line; color dull dark red; dots scattered; bloom thick, bluish; skin tough; flesh reddish-yellow; stone large, round oval, slightly flattened, cling; quality very poor; tree straggling and uncomely in habit.

This variety was brought from the Panhandle of Texas and introduced in 1893 by A. M. Ramsey & Son, then of Burnet county. Glowing accounts are given of the wild plums

from which these were taken, but when brought into cultivation this variety, and others of the same collection, proved to be a great disappointment. The introducers soon ceased to propagate them, but they tell me that since that time they have had frequent inquiries for the plants from those who had bought them before and had found them desirable. *Prunus angustifolia watsoni.*

Simon (*Prunus simoni.*)—Fruit strongly oblate; size large, an inch to two inches in diameter; cavity deep and wide; stem very short; suture shallow; apex a plain dot; color dull dark red; dots many, large and small; bloom faint; skin thick and firm; flesh hard, meaty, yellow; stone small, round, slightly flattened, partially free; flavor sometimes fairly sweet, at other times mawkish and disagreeable; quality fair to good; season early.

Steinman.—"Very good bearer of fair-sized fruit; season of Forest Garden; will sell well."—Steinman, Iowa, in Goff. Probably Americana.

Stickney.—"A Baraboo variety grown by Franklin Johnson of Baraboo, Wisconsin; season and size of Rollingstone; tender-fleshed."—Goff.

Strawberry.—Fruit nearly spherical, small; cavity shallow; stem slender; color red, with a thin bloom; skin thin; flesh yellow, soft; stone roundish, cling; quality poor; tree dwarf, symmetrical and ornamental, but much subject to twig blight. *Prunus angustifolia watsoni.*

Theresa.—Fruit roundish oval; size medium; color reddish-purple; bloom heavy, blue; flesh yellowish-green; flavor mild; quality only good; season early in August in Ohio; tree a heavy and regular bearer, but variety not otherwise recommended by United States Pomologist's Report, 1892, p. 264.

Trostle—"Has a local reputation about Kingsley, Iowa. It is a dark red plum."—The Fruitman. Probably Americana.

Wady (Wady's Early).—"Early and very good, but the tree is a poor grower and the fruit rather small."—Bailey.

Wilson.—Reported to Professor Goff by Edson Gaylord of Iowa as "a very early fine plum." Is this the same as Silas Wilson?

Yellow Panhandle.—Fruit irregular oval; size small to very small; cavity abrupt; stem short; suture light; apex sometimes depressed; color clear red; dots few, indistinct; bloom bluish; skin tough; flesh yellow; stone medium to large, oval, turgid, cling; quality very poor; tree a fairly good grower.

This variety has the same history as Red Panhandle, which see. Another of the sand plums.

XXVIII

The Propagation of Plums

THE nurseryman has no more complicated subject to deal with than the propagation of plums. This will be better realized after a glance at the following exhibit of the principal groups of plums to be propagated (nearly all sufficiently diverse to have received specific rank at the hands of the botanists), and the leading kinds of stocks on which these different groups of varieties may be propagated.

Groups of plums.—Domestica, Damson, Myrobalan (including Marianna), Japanese, Simoni, Americana, Miner, Wayland, Wildgoose, Chicasaw, Watsoni.

Kinds of stocks.—Horse plum, St. Julien, Myrobalan, Marianna, Peach, Apricot, Americana, Chicasaw, Wayland, Sand cherry, Pacific plum.

This summary shows eleven kinds of stocks for eleven different groups of plums. A simple mathematical calculation shows us that there are 121 different combinations possible with these series. If we then take into consideration the added fact that, in each one of these cases, the nurseryman has a choice of two principal methods of propagation,—budding or grafting,—we have doubled the complications, and have offered him 242 different combinations from which to choose. This is rather too liberal for an ordinary nurseryman's peace of mind.

Growing from seed.—New varieties of plums are grown from seed. So are many of the stocks. The seed should be saved as soon as the fruit is ripe, and should preferably never be allowed to dry out. The best treatment is to stratify the seed as soon as gathered, or to give some treatment which amounts to the same thing. The simplest way of stratifying plum pits is as follows: Take any suitable box; one eighteen inches wide, two feet long, six inches deep, is about right. Put a layer of clean, friable soil in the bottom, about an inch deep. Strew a layer of plum pits on this, just about covering the soil with the pits. Then put in another layer of soil, just well covering the pits. Keep on putting in alternate layers of pits and soil till the box is full. Then bury the box, not deeply, in some well-drained place, where the mice will not get at it during the winter and where the pits will freeze. Freezing is not absolutely necessary, but it is advantageous. It softens and cracks the stones. I bury my choicer pits in large flower pots or in pottery-ware seed pans.

In the spring the seeds are sifted out of the soil and planted, or the soil and all may be put into the seed drills. It is better to sift out the seeds. If the stones are of particular value, as when one is handling

hybridized seed, they should be cracked by hand, and only the kernels need be planted.

When pits are handled in large quantities for growing stocks, the same pains cannot be taken. In such cases the stones may either be stratified in large boxes, or they may be planted directly in the rows in the fall, where they are to grow the following season. In the southern states such stocks will grow large enough in one year to be budded in the rows in August or September. In the north, they do not get so large. They are therefore often sown in seed beds, and are transplanted into nursery rows the second spring. Even in the northern states, however, seedling stocks, especially Americanas, are sometimes grown large enough the first year to be grafted; and they are not then placed in the nursery rows till after the grafts are set.

Suckers.—Plums are sometimes grown from suckers. This is said to be a common practice in some parts of Europe. When trees are growing on their own roots, the varieties may be reproduced in this way. A limited number of stocks may be secured in this manner at times when other means are impracticable; and it is said that many of the Domesticas do better in cold latitudes when growing thus on their own roots. But planting plums from suckers is to be severely discouraged in this country. Other and better methods of propagation are too many and too easy, and good plum trees are too cheap, to offer anyone an excuse for persisting in such an archaic practice.

Layers.—Some of the plums grow well from layers. Any plum which will grow from cuttings will grow from layers, and so will some others. The dwarf sand cherries layer more or less in the natural state, and there can be no objection to this method of prop-

agating them in the nursery. Still, layering is not a very desirable method for general use. If the sand cherry comes to be used much for stocks, perhaps the layer method of growing stocks of this species will be found more useful.

Cuttings.—Some of the plums grow well from cuttings. This is especially true of Marianna, and millions of Marianna cuttings are made every year in this country, mostly for stocks. It is best to take the cuttings in the late fall. Cut them to lengths of five to seven inches, and tie in bundles of fifty or one hundred. Place these bundles in boxes of damp sand, sawdust or moss, and keep them from severe freezing till planting time. They may then be set in furrows, or in trenches opened with a spade. The St. Julien plum grows fairly well from cuttings, and nearly all the Myrobalan varieties may be propagated in this way. Some of the Japanese varieties, especially Satsuma, have been grown from cuttings in the southern states. Practically, however, propagation by cuttings is confined to the Marianna.

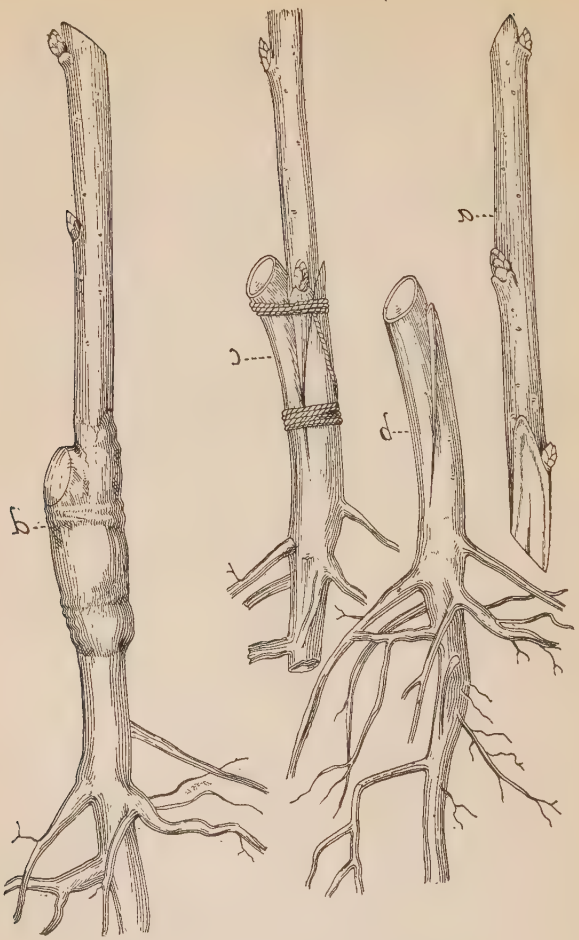
Budding.—The ordinary methods of shield-budding are very extensively applied to the propagation of the plum. This method is used on all stocks. The work is done in August or September, whenever the bark slips best. The process is described in all the books on general horticulture; it has been illustrated and elucidated so often in the horticultural journals, and every fruit grower is so familiar with it, that we need not occupy space to describe it in detail here. Budding is usually easier and cheaper than grafting; and there is a notion prevalent among fruit men that it is better adapted to all the stone fruits. There are certainly some exceptions to be made among the plums. For instance, most varieties when worked

on peach give a better union and make a better tree if worked by the ordinary whip-graft method than when budded. Experiment and experience have both been short on this matter, however; and much remains to be learned.

Whip-grafting.—All nurserymen and fruit growers know how to make and manage whip-grafts. This method has been successfully employed over almost the whole range of plums and stocks grown in America, and has usually been successful. It has done so well in putting plums on peach stocks that Mr. J. W. Kerr and some other extra-conscientious propagators use it exclusively. Even in working on Marianna stocks or Myrobalan seedlings, whip-grafting is sometimes best. In the northwest, where Americana stocks are almost exclusively used, whip-grafting is usually recommended, but not often employed. On this point Professor Craig writes me as follows:

"On the question of budding and grafting the plum, although the latter is talked of a good deal, it is not in it in practice. The only institution, either private or public, that I know anything of, which has propagated plums by grafting in anything like a commercial way, is the Iowa agricultural college. The trouble with root-grafting the plum is that the stand is so very uncertain. Occasionally the propagator hits it all right, but more occasionally he doesn't hit it at all. In 1897 there were propagated about 12,000 plums by this department. As nearly as I can estimate, fully 85 per cent., perhaps 90 per cent., grew. These were side-grafted on Americana stocks. The best success was in using Americana under Americana. However all this may be, the fact remains that 95 per cent. of the plums propagated in this state are by budding methods. I may say that in my own experience in propagating Americana plums on piece roots in the same manner as is practiced with the apple—and I am not sure that this is not the best plan—I have had fair success; I think it a good plan at any rate."

Side-grafting.—This is a method used at the Iowa agricultural college by Professors Budd and Craig,



SIDE-GRAFTING. According to Craig

and by them found to be more successful in some cases than the usual whipgrafting. The accompanying figure, from a drawing furnished by Professor

Craig, illustrates this method of grafting as usually conducted in the grafting room in winter; *(a)* shows the scion cut wedge shape, *(b)* the stock with an oblique cleft for the reception of the scion, *(c)* the scion in position, firmly bound with waxed thread, and *(d)* illustrates the joint completed by a covering of grafting wax to exclude the air. The same method may be employed in the nursery row on stocks set the previous season. A strong growth is secured the first season, surpassing in the north that obtained from a one-year bud.

Top-working.—Plum trees may be top-worked exactly as apple trees are. The new scions may be set in the old tops either as buds, in late summer, or as grafts in early spring. Grafting must always be done before the leaves start. The insertion may be by the cleft method, or by any other scheme which the operator may fancy. The usual way is to set the grafts in a cleft, just as they are commonly set in apple-tree tops. Top-working offers a convenient method of filling up tops broken down by wind or by overbearing. It may be used to change wild or unprofitable trees over to better varieties; or it may be employed to improve imperfect pollination. It is especially convenient for testing new varieties, and this is the use to which it is mostly put among the plum enthusiasts. Almost every one of the real plum cranks has a little test orchard in which the old tops of some discarded trees are cut and patched all over with the scions sent by fellow-victims of the craze. Such a garden is usually a frightful looking place. It suggests a horticultural hospital for the severely wounded. But this is where the plum crank revels! Here he cultivates his imagination, and here he breathes in the inspiration of the collector and the connoisseur.

THE VARIOUS STOCKS

Horse plum.—This is a small-fruited variety of the common Domestica plum, which is sometimes used as a stock, especially in western New York, and especially for varieties of the Domestica and Damson groups. Formerly it was much in vogue, but latterly it has been superseded by Myrobalan and Marianna. It gives a good, strong, healthy, hardy, long-lived tree; but it is more difficult to work and does not give so good results in the nursery as do Marianna and Myrobalan.

St. Julien.—The testimony of western New York nurserymen and plum growers is quite uniformly to the effect that the St. Julien stock is best for the Domesticas, considered from the standpoint of the orchardist. It makes a better, stronger, longer-lived tree than Myrobalan. It grows too slowly, however, in the nursery, and the trees are not so salable at two years old as when propagated on the other stocks. Mr. S. D. Willard writes me as follows: "The trouble is, we can never secure first-class stock of this variety in France; and, too, at the same age, the trees grown on this stock would be about half as large as those on Myrobalan. We could not sell them. You have, therefore, the best reason in the world why the nurseryman would not use this stock."

On this same subject I have the following interesting letter from Messrs. W. & T. Smith of Geneva, New York: "St. Julien stocks are much preferred by the orchardists in this locality, because trees certainly do better in every way on that stock. They sprout less from the root, are longer-lived, and generally more vigorous than when on Myrobalan stocks. We occasionally plant some St. Julien seedlings, but do not make a practice of it, because in the first place St.

Julien seedlings cost more than double the price of Myrobalans, and they are not as thrifty the first year they are transplanted. They also are attacked by a fungus which causes them to lose their leaves early in the summer, thus preventing the budding of the stocks altogether, or a partial failure in the buds when this leaf fungus is not corrected. Of course, when taken in time we can in a large measure prevent this falling of the leaves by spraying with bordeaux mixture, but taking all things into consideration, it is quite a bit more expensive to raise plums on St. Julien stock, and we find that we cannot get any more for them in the open market, so that we have become discouraged growing stocks on St. Julien root."

In view of this testimony, it seems unfortunate that propagation on the St. Julien stock is given up. If plum growers would demand trees worked on this stock, and would pay the increased cost, the nurserymen would be ready at once to supply the demand. St. Julien is not recommended outside of New York, nor for other plums than Domesticas and Damsons.

Myrobalan.—Seedling Myrobalan stocks are imported in large quantities from France. The proportion of these importations varies from year to year, being influenced by the price of the stocks in France, by the tariff, and by the domestic supply of Marianna and peach stocks. This is the stock most commonly employed in the northern states, and it is also freely used by many southern nurserymen. Its advantages are cheapness, ease of working, readiness with which it unites with all scions, freedom from sprouting, and ready, clean growth in the nursery. In the old books on horticulture, the Myrobalan is usually mentioned as a dwarfing stock for the plum; but in this country, with our climate, soils and pruning, it produces a

standard tree. In the Mississippi valley it is subject to root-killing in cold winters.

Marianna.—The Marianna plum appears to be about two parts Myrobalan and one part Chicasaw. It has much the same characters, used as a stock, as the seedling Myrobalan trees imported from France. Its advantage is in the ease with which it may be propagated by cuttings, especially in the south. This enables nurserymen to grow their own stocks,—an opportunity of which they often find it advisable to avail themselves. As the growing of cuttings is especially easy in the southern states, the Marianna plum has been more often used as a stock in the states south of the Ohio river. Some southern nurserymen use it exclusively; but it seems to me that it is waning somewhat in its popularity. In choosing between Marianna and Myrobalan, however, a nurseryman would be influenced chiefly by the matter of price, and would nearly always select the cheaper—which is apt to be the Marianna.

Peach.—The peach has several important advantages as a stock for the plum. The seed may usually be had cheaply from the canning factories, the pits ordinarily give a good stand of strong stocks fit to bud the first year, and after budding the young trees grow thriftily in the nursery. These circumstances make it possible for the nurseryman to grow the best grade of marketable young trees at a minimum expense. Moreover, the peach roots are known to be especially well suited to light, sandy soils. Nevertheless, there has always been more or less prejudice against the use of peach stocks for plum trees. This prejudice has taken two points of view: First, it has assumed that the peach stock and the plum scion do not make the best possible union, and that the tree is therefore liable to be short-lived in the orchard; and second, plum trees on peach

stocks are less hardy than on plum stocks, especially in the north. Neither of these assumptions is so well supported by experiment and observation as might be wished. Some of the thriftiest and hardiest young trees which I know in Vermont are growing on peach roots. Nevertheless, I am far from recommending peach stocks for northern planters. Indeed, I am inclined to share the popular prejudice against them, and to believe that they should not be used for northern trees. Mr. Kerr of Maryland, who uses peach stock somewhat extensively, always whip-grafts his scions upon the peach roots; and says he would not bud plums on peach under any circumstances. In most cases he secures his plum trees on their own roots in this way. This is desirable except with varieties which are apt to sprout.

On the whole, it may be said that the peach has plain and undeniable advantages as a stock; that, though there is good reason to suspect it of certain weaknesses, these weaknesses have not been fully proven; and that, under these circumstances, the peach will probably continue to be used as a stock for plums in the south for many years to come.

Apricot.—As a stock for the plum, the apricot stands on a level with the peach. It is more seldom used, chiefly because the seed is harder to get. Near the California canneries, though, where apricots are largely canned, apricot seedlings have often been used for budding plums. They are not generally recommended.

Almond stocks are also sometimes used.

Peach, apricot and almond are especially suited to light soils, and trees on these stocks may sometimes be preferred on this account.

Americana seedlings.—In Wisconsin, Iowa, Nebraska, and all the region to the northwest, Americana

seedlings are used almost to the exclusion of other stocks. Some Myrobalan stocks are used in southern Iowa and Nebraska for Domestica and Japanese varieties and occasionally for Wildgoose sorts. But this is the only exception. Americana seedlings make good, strong, thrifty stocks; and they seem to unite well with nearly all classes of plums. Experiments made by the writer indicate that they are adapted to a much wider range, botanically and geographically, than has been generally supposed, though it is said by propagators of experience that they are not suited to the Japanese and Domestica varieties. Their use, now practically exclusive in the northwest, is rapidly increasing in other neighborhoods; and we may expect to see them tried more and more by nurserymen in other localities as the price of the stocks decreases. Already Americana stocks are a staple article in the northwest, and are regularly quoted in the wholesale price-lists. The price is still considerably higher than for Myrobalan, Marianna or peach stocks, but seldom exceeds ten dollars a thousand. Some correspondents in the northwest recommend Mner stocks; but I doubt if these can be distinguished from Americanas.

Chicasaw stocks.—Seedlings and suckers of the Chicasaw species have been used for stocks, though never on a large scale. They are supposed to be especially adapted to low, wet lands, or where an annual overflow is to be expected. The serious objection to them is their tendency to sprout.

The western dwarf form of this species *(Prunus angustifolia watsoni)* has been recommended time and again for trial as a stock; but though I have known of various experiments undertaken, I never heard of one so far finished as to give a fair idea of the advantages and drawbacks of this plum as a stock. It would prob-

ably dwarf the trees worked on it; and would probably be subject to the same difficulty of sprouting mentioned in connection with the Chicasaws proper.

Wayland seedlings.—Mr. J. W. Kerr has experimented somewhat extensively with seedlings of the Wayland group, and finds them to have several material good points as stocks. The stocks never sucker. They unite most satisfactorily with all varieties of the Wildgoose, Wayland and Chicasaw groups; and also with those of the Miner and Americana groups. Mr. Kerr thinks this is "the best general stock" that he has ever tried. The serious difficulty is in getting the stocks. Wayland, Golden Beauty and all their relatives refuse absolutely to grow from cuttings, they do not sucker, and the seeds are hard to get. They are not in the market, and every man has to depend on what he can gather in his orchard. This makes them out of the question as a commercial stock, but they are worth recommending to plum amateurs.

Pacific plum.—The Pacific plum, *Prunus subcordata*, has been tested as a stock in California, but has not been found to show important good qualities. It dwarfs the scion and is inclined to sucker.

Sand cherry.—Many experiments have been made with the western sand cherry, *Prunus pumila besseyi*, especially in Iowa, South Dakota and Minnesota. Some fair degree of success is reported by Professors Budd, Hansen and Craig, by Mr. J. S. Harris, and others. Budd found that all classes of plums, including the Domesticas and Japanese, united with this stock. The best success was secured when the stocks were budded, though a fair proportion of the scions grew when whip-grafted or side-grafted. (See Iowa Hort. Soc. Trans. 28:404. 1893.) This stock dwarfs the plum, more or less, and is sometimes inclined to

sprout. It is, however, very hardy and easy to grow in a small way, so that experiments in its use are likely to be continued.

Other stocks.—The Japanese plums have been tried in a few cases, and have given fair success. There is every reason to believe that seedlings of the Japanese plums would give as good results as the peach, or better. The trouble is that the seed has never yet been plenty enough to be tried extensively. I have seen scions of all sorts top-worked in Japanese trees. Usually a good union is secured and a satisfactory growth made, though the Japanese trees frequently overgrow other varieties, and the abundant sap sometimes "drowns" a slow-starting scion.

The common choke-cherry has been experimented with to some extent. Buds of plum can be made to take on it, but I never heard of a tree which came to maturity on this stock.

In like manner, buds will take on the common black cherry, *Prunus serotina;* but they do not live long. I have known them to survive two years, but never to make trees.

SUMMARY

The matter of propagation of plums may be briefly summarized as follows, it being fully understood that this condensed recapitulation overlooks many important exceptions.

As regards stocks.—Horse plum: For Domesticas and Damsons in New York.

St. Julien: Makes best trees of Domesticas and Damsons for northern orchards, but is not used by the nurserymen on account of expense incurred and small size of nursery trees.

Myrobalan: Most popular general stock in northern and central states. For all sorts of plums.

Marianna: Good general stock for central and southern states. For all sorts of plums, except Americanas.

Peach: Cheap and easy to handle. Good for light soils and southern localities.

Apricot: Much like peach, but not often used.

Americana plum: Best for Americanas. Best for all plums at the northwest, except Domesticas, and perhaps more widely useful than is yet known.

Chicasaw plum: For wet soils, southward. Sprouts.

Wayland-like plums: Good general stock, but difficult to get.

Pacific plum: Not promising. Sprouts.

Sand cherry: Promising for the northwest.

Other stocks: Have some experimental interest, but no demonstrated practical value.

As regards scions.—Domesticas: Make best trees on St. Julien or Horse plum, but can be more cheaply grown on Myrobalan. Will grow also on Marianna.

Damsons: Same as Domesticas.

Myrobalan plums: Can usually be grown from cuttings or on their own roots. When grafted or budded should be worked on Marianna or on Myrobalan roots.

Japanese: Succeed well on peach for southern states. For northern states are usually worked on Myrobalan. Marianna also often used.

Simon plum: On peach, Myrobalan or Marianna, in this order.

Americanas: Best on Americanas or own roots, especially at the northwest, where this stock is indispensable. Can be worked on Wayland or Marianna.

Miners: About the same as Americana in their requirements.

Waylands: Probably best on Wayland seedlings. Will do well on Marianna, Myrobalan or peach.

Wildgoose: Works well on peach for the south and for light soils. Marianna also used in the south. Northward mostly worked on Myrobalan.

Chicasaws: On peach, Marianna or Myrobalan, in this order.

Sand plums: Try Myrobalan first.

Ornamental varieties: Work these on various stocks, depending on the species from which they are severally derived.

As regards locality.—Quebec, northern New England and adjacent territory: Use Americana stocks. Where the Domesticas are grown St. Julien or Horse plum may be used.

Manitoba, Minnesota, the Dakotas, Wisconsin, Iowa and adjacent territory: Use Americanas and Sand cherry.

Southern New England, New York, Pennsylvania and Ohio: Use St. Julien for Domesticas and Damsons whenever possible. In other cases use Myrobalan.

Indiana, southern Illinois, Missouri, Kansas and southern Colorado: Use Myrobalan or Marianna, or Peach on light soils, or for Japanese varieties.

From Maryland to southern Colorado and southward: Use peach, Marianna or Myrobalan, according to cost of propagation.

XXIX

The Selection of Varieties

IF a stranger were to write to me and ask me to select a wife for him, I should be somewhat embarrassed by the request. Yet the problem would be only a little more difficult than the one which is constantly presented to the experiment station officer, or the specialist, who is almost daily in receipt of letters asking for a selection of varieties of strawberries or plums.

The fact is, the best varieties for any man are the ones which do best for him. This nobody can discover but himself. Often the varieties which do best are simply those which he likes best. He takes most interest in them. He cares most for them. He gives them better culture,—which is saying the same thing,—and they succeed accordingly.

The selection of varieties is very largely a per-

sonal matter. It depends more on the person than it does on the variety. Still, it does depend partly on the variety; and there are, therefore, two different things to be taken into consideration in making a choice. The qualities of the variety must be considered; but one must consider first the qualities of the man who is going to grow it. I would consider the qualities of the man as well as the characteristics of the woman if I were selecting a wife for some confiding client.

In making a selection of plums, the personal prejudices of the grower are apt to be more cogent and are likely to assert a greater influence in the result than in dealing with any other class of fruits. There are men who believe that there is no salvation outside the Japanese plums. It would be foolishness for them to plant Americanas. Other men think that the Domesticas are the only civilized plums, and that "the natives will do very well in sections where the European varieties cannot be grown." Such men should grow Lombard and Gueii. Still another man will shrug his shoulders and say that "American plums are good enough for America." Let him take my blessing and a parcel of De Sotos and Quakers and go on to success. The author believes in all sorts of plums. He has his prejudices, too; but that is his private affair.

Due consideration must also be given to the fact that local adaptation is a matter of grave importance with all fruits, and more so with plums than with anything else handled by the American horticulturist. Domesticas will not succeed on the eastern shore of Maryland, no matter what the prejudices of the grower. The Chicasaws cannot be recommended for Quebec. The Americanas are conspicuous failures in most parts of the south. And in western New York, where they grow the finest Domesticas on this continent, it is wonderful what worthlessness the natives will develop.

These questions of local adaptation have been closely studied in the last ten years, and the adjustment of varieties to localities is rapidly advancing. There is, of course, much yet to be done; but much of the rough work has been executed.

In the following pages a large list of selections will be offered. Some of them are made on the authority of the writer; others rest on the experience of the best plum growers in all parts of the land. All of them, however, are presented subject to the qualifications already made, which may be briefly reviewed in saying that the selection of varieties rests upon three separate considerations: First, local or geographical adaptation; second, personal preferences of the grower; third, intrinsic qualities of the variety.

MARKET VARIETIES

We will consider first the selection of varieties for market. It will be understood that, in making market plantings, a smaller number of varieties are to be chosen, and that good looks and shipping qualities are supremely important. Furthermore, certain markets call for certain varieties. In some places Damsons are in demand. In other places Green Gages are wanted. But in general it may be said that the demands of the market may be ignored to a very great extent in selecting plums, especially if the market be a small one which can be pretty thoroughly covered by the grower. Very few fruit buyers know anything about plums. They ask for Damsons or for "blue plums" because they know of nothing else. If any good variety is offered to them, year after year, they soon take up with it. I know a grower whose trees were mostly Lombard. Presently he had some De Sotos come into bearing. The first year he had to give

away the De Sotos; but the second year his customers took them in preference to the Lombards. This experience has been duplicated hundreds of times.

Let us now take up the selection of varieties by geographical districts.

Nova Scotia and adjacent territory.—Domesticas are mostly grown. Japanese varieties are being introduced, and are mostly successful. In choosing particular varieties, one may select those generally recommended in western New York and Michigan.

Quebec, Northern Ontario, Northern Maine, New Hampshire and Vermont.—The Americanas and Nigras are best here. Some new Domesticas and Japanese varieties are grown experimentally, or are fairly successful in the less inclement locations. Specially suitable varieties are De Soto, Hawkeye, Cheney, Quaker and Wolf. The best Americana or Nigra varieties, however, may be planted without the slightest hesitation.

W. T. Macoun, horticulturist at the Dominion experimental farms, Ottawa, recommends Cheney, Wolf, Stoddard and Wyant.

New England in general.—Domesticas, Japanese varieties and Americanas all succeed here. Wildgoose, Pottawattamie, Wayland, and many other sorts of other groups have proved locally successful. Lombard is one of the best paying Domesticas. Damsons also market well. The best of the Japanese for market are Abundance, Burbank, Red June and Chabot. These succeed over almost the whole of this section. The varieties recommended by the American Pomological society* are the same as those recommended for New York, which see.

---

*The recommendations quoted in this chapter are from the Revised Catalog of Fruits of the American Pomological Society, Division of Pomology, Bulletin No. 8, 1899.

A. A. Halladay, southern Vermont, recommends Burbank, Abundance, Lombard, Red June.

D. C. Hicks, southern Vermont, recommends Lombard, Bradshaw, Pond, Gueii, Shropshire, Jefferson, Quackenboss, Grand Duke.

Professor S. T. Maynard, central Massachusetts, recommends Bradshaw, Gueii, Kingston, German Prune, Wildgoose, Abundance, Burbank.

H. L. Fairchild, Connecticut, recommends Burbank, Satsuma, Red June, Chabot, Abundance.

New York, Northern Ohio, Southern Ontario, Southern Michigan and Central Pennsylvania.—The Domesticas rule here. The Japanese varieties, however, are successfully grown by numerous adherents. The list of varieties specially recommended for market by the American Pomological society are Bavay, Bradshaw, Damson *(sic!)*, Diamond, German Prune, Grand Duke, Gueii, Imperial Gage, Italian Prune, Kingston, Lombard, Quackenboss, Yellow Egg, Abundance, Burbank, Chabot, Red June.

S. D. Willard, Geneva, New York, an extensive grower of plums for market, recommends Bavay, Grand Duke, Arch Duke, Monarch, Diamond, French Damson, Red June, Burbank.

W. & T. Smith Co., Geneva, New York, large growers of plums, recommend Golden Drop, Bavay, Pond, Burbank, Diamond, Quackenboss, Shropshire, Italian Prune.

C. E. Hunn, Cornell Experiment station, gives the following list: Bavay, Lombard, Shipper, German Prune, Red June, Abundance, Burbank.

S. A. Beach, experiment station, Geneva, New York, "suggests for consideration" the following: Early Rivers, Bradshaw, Diamond, Hudson, Italian Prune, French Damson, Monarch, Grand Duke, Copper, Bavay, Czar, Gueii, Burbank.

W. Paddock, experiment station, Geneva, recommends Bavay, Field, Hudson, Bradshaw, Italian Prune, Diamond, King of Damsons.

Professor George C. Butz, State College, Pennsylvania, gives the following list: German Prune, Green Gage, Arctic, Lombard, Damson.

Professor L. R. Taft, southern Michigan, recommends Field, Bradshaw, Lombard, Gueii, Grand Duke, Diamond,

Monarch, Golden Drop, Bavay, Burbank, Abundance, Red June and Wickson.

Wisconsin, Minnesota, Manitoba, Montana, the Dakotas, Iowa and Northern Nebraska and Colorado.—This section is almost exclusive in its adoption of the Americanas. Nearly all the varieties of this group succeed in this section. Miner does well with some growers, but practically all the plums grown for market,—and the quantity is large,—are of the Americanas native to that soil.

Canvassing the votes recently taken of the leading plum specialists of this region, we have the following result, the number set opposite each variety being the number of times it was mentioned out of twenty votes:

De Soto	13	Stoddard	5
Wyant	12	Rollingstone	4
Wolf	10	Surprise	4
Hawkeye	9	Aitken	3
Forest Garden	8	Cheney	3
Miner	6	Hunt	3

This list may be looked on as the best possible general recommendation of market plums for the northwest.

In southern Iowa and Nebraska, Wildgoose and Pottawattamie are very generally recommended as market plums.

Kentucky, Indiana, Illinois, Missouri, Kansas and Colorado.—This area varies considerably in soils, and there is no well-defined area of plum culture. Opinions regarding varieties for market are therefore much diversified. A few may be quoted.

Professor J. Troop, Indiana Experiment station, names Wildgoose, Wolf, Damson, Shipper, Bradshaw, Lombard, Burbank.

L. A. Goodman, Westport, Mo., secretary of the Missouri Horticultural society, recommends Wildgoose, Weaver, Abundance, Burbank, Damson, Lombard.

Frank Holsinger, eastern Kansas, who grows many plums for the Kansas City market, recommends Pottawattamie, Wildgoose, Wickson, Weaver, Red June, Wolf.

E. P. Bernardin, southeastern Kansas, prefers Wildgoose, Miner, Pottawattamie.

R. Bradley, central Kansas, grows Abundance, Burbank, Wickson, Red June, Wildgoose, Pottawattamie, Milton.

The preponderance of Wildgoose and its kin in these lists is striking. It may be recalled that this is the home of the Wildgoose. This variety, with its near relatives, and some of its new hybrid progeny, may be safely recommended as the best market plums for this section.

Maryland, Virginia and adjacent territory.—The Japanese varieties have been largely tested in this section, and a number of market growers have been successful with them. Most of the Japanese varieties, however, are very badly affected with the fruit rot here, and have been discarded from many orchards on that account. Native sorts, particularly of the Wildgoose, Chicasaw and Wayland groups, do very well, but the local markets do not seem to be so hospitable to the fruit as might be wished.

J. W. Kerr recommends for the eastern shore of Maryland the following list: Milton, Munson, Whitaker, Smiley, Dunlap, Newman, Roulette, Downing, Clifford, Cluck, Sophie, Wooten, Beaty, Lonestar, Prairie Flower, Idall, Indiana.

H. E. Van Deman of the maritime counties of Virginia recommends Whitaker, Milton, Newman, Abundance, Burbank, Wickson, Golden Beauty.

J. S. Breece, Fayetteville, N. C., names Ogon, Abundance and Chabot.

Georgia, Tennessee, Oklahoma and southward.—In this section the Domesticas and Americanas, with a few exceptions, are total failures. The Japanese plums have been widely tested and are extensively grown by some persons. The Wildgoose, Chicasaw and Way-

land varieties are entirely at home, and furnish the real basis of the commercial plum interests. Many hybrids are appearing in this section; and especially those of Chicasaw, Wildgoose and Japanese blendings seem to be of peculiar promise here. Gonzales, Excelsior, and Golden are worthy of special mention. The following recommendations from growers and experimenters of experience should be carefully considered.

A. L. Quaintance, Georgia Experiment station, recommends Wildgoose, Wayland, De Caradeuc, Abundance, Burbank, Red June.

G. L. Taber, Glen St. Mary, Fla., specially recommends Excelsior and names after that the Japanese varieties, Burbank, Abundance, Kelsey and Berckmans.

Professor F. S. Earle, northern Alabama, names Red June, Abundance, Burbank, Chabot, Wayland and Golden Beauty, "the last two for southern markets only."

O. M. Morris, horticulturist of the Oklahoma Experiment station, recommends Wildgoose, Weaver, Wooten, Pottawattamie and Golden Beauty.

T. V. Munson, northern Texas, an expert pomologist of wide reputation, recommends Milton, Clifford, Abundance, Burbank, Chabot, Miner.

F. T. Ramsey, central Texas, names Gonzales, McCartney, Hale, America, Apple, Captain, El Paso, Fanning, Indian Chief, Lonestar, Mason, Robinson, Wildgoose, Wooten, Wickson, Chabot, Burbank, Arkansas.

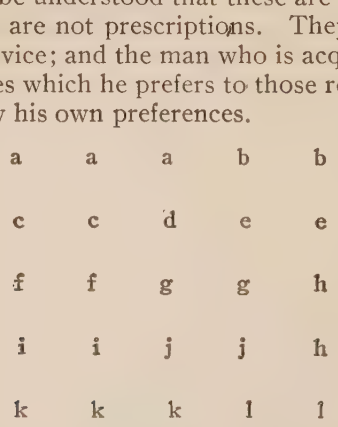
VARIETIES FOR HOME USE

It is a generally accepted principle among pomologists that, in selecting varieties for home use, the grower may exercise his personal preferences to a much greater degree, that he may make a longer list, and that he may include many varieties of less thrift and prolificacy than could be admitted to a commercial orchard. This means, in a general way, that the lists given above may be merely expanded somewhat according to individual tastes; but that the market list may nevertheless serve as a safe basis for making up the home-use list.

THE DOORYARD PLUM TREE Wildgoose in this case

Everyone will see the danger of making a general recommendation of any varieties for the home garden where so much depends on personal preferences. Yet the man who is totally unacquainted with varieties must perforce depend on the judgment of some one else to make his first selection for him. To meet the wishes of this class of planters, the author will present, in the next few pages, a number of specific suggestions for planting home plum orchards. The arrangement of the trees in the plots is also shown, consideration being given to the matter of pollination. The selections offered are intended to give as great a variety as possible, both in character of the fruit and in season. They have been made after careful study of all the conditions, and after consultation with the best plum growers in each region.

It must be understood that these are only suggestions. They are not prescriptions. They are for the use of the novice; and the man who is acquainted with other varieties which he prefers to those recommended should follow his own preferences.



Suggestion for a home orchard of twenty-five trees in New England. The same selection and grouping would be recommended for Nova Scotia.

a, 3 Lombard; *b*, 2 Bavay; *c*, 2 Pond; *d*, 1 Shropshire; *e*, 2 Jefferson; *f*, 2 De Soto; *g*, 2 Hawkeye; *h*, 2 Cheney; *i*, 2 Abundance; *j*, 2 Chabot; *k*, 3 Burbank; *l*, 2 Red June.

a	a	a	b	b
c	c	c	d	d
e	e	e	f	f
g	g	g	h	h
i	i	j	j	k

Suggestion for a home orchard of twenty-five trees in New York, southern Michigan or adjacent territory.

a, 3 Bavay; *b*, 2 Peters; *c*, 3 Jefferson; *d*, 2 Washington; *e*, 3 Italian Prune; *f*, 2 Victoria; *g*, 3 Red June; *h*, 2 Pond; *i*, 2 Satsuma; *j*, 2 Burbank; *k*, 1 Shropshire.

a	a	a	b	b
c	c	d	d	e
f	f	g	g	e
h	h	i	i	j
k	k	l	l	j

Suggestion for a home orchard of twenty-five trees in northern Iowa and northward. Approximately the same plan might be followed in the colder parts of Quebec, Ontario and adjoining territory.

a, 3 Stoddard; *b*, 2 Quaker; *c*, 2 Bixby; *d*, 2 Surprise; *e*, 2 Aitken; *f*, 2 Cheney; *g*, 2 De Soto; *h*, 2 Hawkeye; *i*, 2 Wyant; *j*, 2 Snooks; *k*, 2 Wolf; *l*, 2 Forest Garden.

a	a	a	c	c
d	d	b	e	e
f	f	g	h	h
i	i	j	j	k
l	l	m	m	k

Suggestion for a home orchard of twenty-five trees on the Maryland-Delaware peninsula or in adjoining states.

a, 2 Wayland; *b,* 2 Benson; *c,* 2 Kanawha; *d,* 2 Prairie Flower; *e,* 2 American Eagle; *f,* 2 Dunlap; *g,* 1 Smith; *h,* 2 Whitaker; *i,* 2 Munson; *j,* 2 Milton; *k,* 2 Kerr; *l,* 2 Abundance; *m,* 2 Chabot.

a	a	b	c	c
d	d	e	f	f
g	g	e	h	h
i	i	j	k	k
l	l	j	m	m

Suggestion for a home orchard of twenty-five trees for Kentucky, Tennessee, Indiana, southern Illinois, Missouri, Kansas, and the neighboring territory.

a, 2 Wayland; *b,* 1 Miner; *c,* 2 Wyant; *d,* 2 Quaker; *e,* 2 Smith; *f,* 2 Wildgoose; *g,* 2 Golden; *h,* 2 Milton; *i,* 2 Gonzales; *j,* 2 Red June; *k,* 2 Pottawattamie; *l,* 2 Abundance; *m,* 2 Burbank.

a a a b b

c c c d d

e e e f f

g g g h h

i i i j j

Suggestion for a home orchard of twenty-five trees for Florida, Alabama, Mississippi or Louisiana.

a, 3 Excelsior; *b*, 2 Wayland; *c*, 3 Gonzales; *d*, 2 Golden Beauty; *e*, 3 America; *f*, 2 Wildgoose; *g*, 3 Red June; *h*, 2 Abundance; *i*, 3 Kelsey; *j*, 2 Chabot.

a a a b b

c c c d d

e e e f f

g g g h h

i i i j j

Suggestion for a home orchard of twenty-five trees for Texas, Arkansas or Oklahoma.

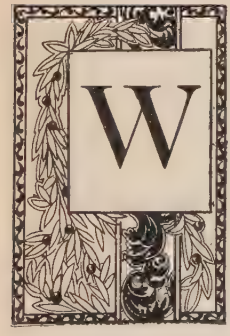
a, 3 Gonzales; *b*, 2 America; *c*, 3 Milton; *d*, 2 Wooten; *e*, 3 Mississippi; *f*, 2 Chabot; *g*, 3 Abundance; *h*, 2 Red June; *i*, 3 Wayland; *j*, 2 Golden Beauty.

It may be repeated that the foregoing plots of plum gardens are only suggestions, and that they are

made only for the beginner. As soon as a man begins the cultivation of plums, he should plant a small experimental plot and put into it as many of the promising better sorts as his means and inclinations may provide. From this experimental planting he will be able presently to select the varieties which he wants to grow more extensively. From this experimental planting, too, he is likely to reap many other benefits. He will develop a greater love for the plums, and so a greater proficiency in their culture; and he will be introduced to all the engaging and elevating reflections of the amateur pomologist,—the true fruit-lover.

XXX

Orchard and Garden Management



HEN Henry Ward Beecher was editor of a column of horticultural notes in the Western Farmer and Gardener of Indianapolis, Indiana,—that is to say, about the year 1850,—he wrote these words: "A few plum trees will suffice for a private family, and the fruit must be earned by careful watchfulness. . . Plum *orchards* are not to be thought of."

Nevertheless, extensive plum orchards are now fruiting in many parts of North America,—on the Pacific coast, in Texas, Iowa, New York, Ontario. Many more are being planted. The management of plums in orchard plantations has therefore become an important branch of contemporary horticultural knowledge.

A MARYLAND ORCHARD OF WILDGOOSE PLUMS

The plum is also a garden tree, and peculiarly suited to the small home fruit garden, either on the city lot or in the farmyard. Plum trees in the garden, however, demand precisely the same treatment that they do in large orchards. The following discussion applies equally to the two series of conditions.

Soils.—Plums will not grow on solid rock, but they will succeed on any kind of soil. Professor Bailey has remarked that, next to the apple, the European plum, *Prunus domestica*, has probably the most generalized adaptability to all sorts of soils of any known tree. Then when we take into account the Japanese plums and all the various American species with their wide diversities of adaptation, we have a selection of plants to cover the whole range of soils.

The Domestica and Damson plums are generally said to grow best on rather heavy clay loam; at least they do not do their best on light, sandy soils. A heavy clay loam need not be wet and cold; and if it is well drained and comparatively warm, it forms an ideal soil for the European races of plums.

The Japanese plums prefer rather lighter soils. A light, warm, friable loam, with a moderate admixture of sand, suits them best. They will do well, however, on soil which is decidedly sandy.

The Americana plums need about the same soil as the Domesticas. A rich, heavy loam is much the best for them, though a moderate amount of sand does not interfere with their thrifty growth in favorable climates.

Varieties of the Miner group have the same needs as the Americanas.

Wayland and its near relatives prefer lighter soils. They thrive in Mr. Kerr's Maryland sand pile, but generally do better in soils containing more clay. A light, warm, sandy loam may be regarded as their preference.

Wildgoose and the varieties of closest relationship have a wide range of adaptability to differing soils, but may be regarded as most at home on rich, sandy lowlands. Cold, heavy clay is distasteful to them. In general they do not reach perfection in those localities where the European varieties are most successful.

The Chicasaws have much the same preferences as the Wildgoose varieties. They are said to do well on low, wet land, where they are subject to annual overflows, but I do not know of anyone who has tested this point in orchard planting.

The hybrid varieties, which will probably be of increasing importance, must be treated in view of their individual affinities. Those which partake most of the Japanese characters may be managed like the Japanese plums; and those which are more Wildgoose-like should have the treatment of the Wildgoose plums.

Exposures.—All other conditions being satisfactory, the plum orchard should have a southeastern exposure,—that is, the field may slope more or less toward the southeast. A southwestern exposure is not desirable except on cold, backward soils. If late frosts are a source of danger, a northeastern or northwestern exposure may be better, as these will retard the blossoming more or less in the spring. The Japanese varieties, being specially early bloomers, require most consideration in this respect. Still, my observation leads me to believe that the danger from late spring frosts is not so great a factor in plum culture as it is often felt to be.

Drainage.—Plum trees respond as quickly as any other plants to an improved mechanical condition of the soil. Any soil, therefore, which will be improved by drainage,—and there are thousands of acres of such soil,—should be drained for plum trees. The fact

that the Domestica plums like a heavy clay does not mean that they like a damp, cold, clammy soil, in which the necessary transformations of plant food go on feebly and ineffectively. And the notion that the Chicasaw plums like low, wet land should not be relied on too far when drainage is being considered.

The purpose of drainage, especially underdrainage, is to make the soil drier and warmer during wet weather, and cooler and moister during drouth. Such amelioration is in no wise unsuited to plum trees of any species. On the contrary, they will pay as well for that kind of treatment as any other crop.

Planting.—The selection of varieties naturally demands first attention; but this is a matter of such importance and one involving so many considerations, that a separate chapter is devoted to it. In general, it may be said that two-year-old trees should be selected for planting. Sometimes three-year-old stock, particularly of slow-growing sorts, is satisfactory. Occasionally one finds southern-grown trees of Japanese and certain native varieties which are fit to plant at one year old. Such young stock handles and ships cheaply, but is not to be generally recommended.

In buying plum trees, more than the usual amount of attention has to be given to the stocks on which they are propagated. This subject is fully discussed in the chapter on propagation. It is not always that the planter can secure just the stocks desired, but if he would make his wants more evident to the nurseryman,—and back them up with the cash!—there would be less and less difficulty on this score.

The question of whether it is better to buy of local or of distant nurseries is one often discussed, but of no practical importance. Buy trees by quality first and by price second. At the Vermont Experiment station we have planted young plum trees from Can-

ada, New York, Iowa, Maryland and Texas. They have done equally well,—or, if there has been any difference, it has been against the northern-grown trees, which is quite contrary to the common prejudice.

The distance apart for planting plum trees varies somewhat for soils and localities, and greatly for the varieties to be set. Abundance, for instance, may be set ten feet apart, while Burbank should have twice as much space. Domestica varieties in rich ground require eighteen to twenty feet, but if kept closely pruned, may be set a little closer. For a mixed orchard, twelve to fifteen feet may be regarded as the proper planting distance. If spraying with a mounted sprayer is to be a part of the orchard operations, the distance must be increased to twenty or even to twenty-five feet.

Fall and spring planting are often contrasted and their special advantages discussed. Nobody can say which is the better, because either is or neither is. It depends on the locality, season, condition of the soil, condition of the trees, and on other circumstances. If the soil is well prepared, and the trees are ripe and ready, they may be set in the fall. If they are not, the trees should be stored or well heeled-in till spring opens.

Varieties should be mixed in planting with reference to cross-pollination. This subject is judged to be of sufficient importance and complication to demand a separate chapter.

Cultivation.—The plum orchard should have the same cultivation as the apple orchard. Horticulturists are thoroughly agreed on this point. They are practically agreed also that this means a general plowing in spring, with clean surface culture till the middle of July or first of August, and a cover crop for fall. The

spring plowing should be given as soon as the ground can be worked to advantage, and, though it need not be deep, should be as thorough as the conditions will permit.

The summer surface culture is important. For this purpose a sharp-toothed harrow is the most useful tool. I know one man, who is very successful in the garden culture of plums, who uses a garden rake by hand. Another friend tells of visiting this plum grower one day, and of seeing the cat run through the garden, whereupon the plum man seized the garden rake and followed after to rake up the cat tracks. *This man makes money from his plums.*

Soil and locality determine which is the best cover crop. For sandy soils in the south, cowpeas and crimson clover are best. For northern states and heavier soils, mammoth clover, peas, rye or buckwheat are to be preferred, about in the order named. These cover crops should be sown about July 15th to August 1st, when the weather is most favorable. An abundance of seed should be provided. A scant cover is a much more frequent mistake than a too heavy cover.

On the general subject of cultivation I wish to quote a letter from the well-known plum specialist, Professor E. S. Goff of Wisconsin. He says: "The orchard should not be seeded to grass, but an occasional crop of clover will be beneficial for most soils. I prefer to cultivate the ground till midsummer at least, without growing a crop. Then I would sow oats, clover, or cowpeas. If the trees are too close to admit of horse cultivation, the whole ground may be mulched with good results."

J. W. Kerr recommends for Maryland "thorough tillage from May 1st to August 1st; then seed to crimson clover to plow in first of May subsequent."

Professor F. S. Earle says: "In Alabama plums demand precisely the same treatment as peaches."

Irrigation.—In some of the states this side of the Rocky mountains, and in most of those on the other side of the divide, irrigation is common in orchards. It is not possible to discuss here all the principles and practices of irrigation; but we may take note that irrigation in the plum orchard is much the same as in the apple orchard or among any other growing trees. Irrigation is practiced during the early part of the season and remitted after midsummer, just as cultivation is. Irrigation serves the same purpose as cultivation. It is intended to furnish water to the growing plant and to aid in the solution of plant food.

The commonest method of applying water to orchard trees is by the furrow system. A clean, even furrow is run on either side of a row of fruit trees, following the slope of the land, and the water is turned into these furrows. Often the tree rows are planted following the general slope in order to facilitate this work. After the water is turned off, and as soon as it has been sufficiently absorbed, cultivation is given. Special care is taken to cover in the furrows which have been lately soaked with water. This is to prevent the formation of a hard surface crust and the consequent rapid evaporation of the moisture. Irrigation, however, is a complicated matter; and persons who are new to it would better consult some special work on the subject.

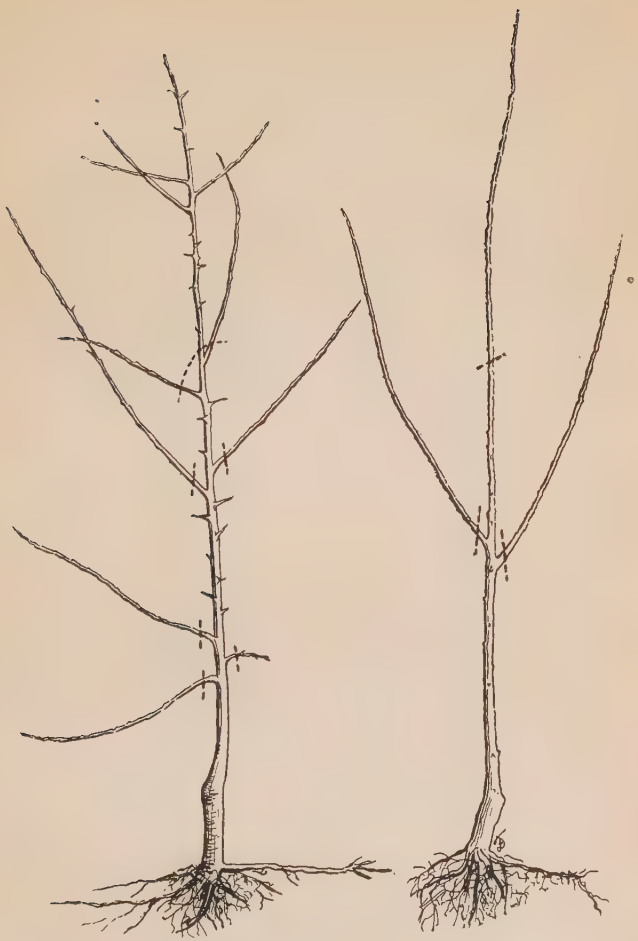
Pruning.—Plum trees do not generally require so much pruning as apple trees. Most of the varieties of the Domestica race make fairly good heads of their own accord, and these need only to have occasional branches removed to keep the tops from getting too thick. The native sorts, like Wildgoose, Marianna and most of the Americanas, naturally make very

18 AN IRRIGATED PRUNE ORCHARD ON THE PACIFIC COAST

dense, thick, thorny heads, into which it is sometimes difficult for a picker to penetrate. Nevertheless, severe pruning of these varieties is seldom practiced. They do not seem to respond well to it. I do not know a single grower who prunes his native plum trees so severely as apple trees are habitually pruned. The idea seems to prevail that the less one can get along with the better. This has not been so much the subject of careful experiment as it ought to be; but the author feels constrained to give his advice in support of this common feeling. Of course, broken, splitting, and interfering branches should always be removed, and just as early as possible.

Certain native varieties grow in very poor forms. The trees are crooked, straggling or ungainly. Such habits must be corrected as much as possible by pruning, depending in each case on the peculiarities of the variety. It is to be expected that, in the evolution of plum culture with the native varieties, those sorts of ugly growth will be eventually eliminated. It has been so with apples, even though the reason and the opportunity for it are much less than with plums.

A few very rank and sprawling growers, like Burbank, demand severe heading-in every year. I have often seen Burbank trees bearing loads of fruit and making an annual growth of six feet, or in some cases even more. The best growers that I know cut back this annual growth from one-half to three-fourths. It will be seen that even with this cutting back, the trees will sometimes get beyond bounds. If they do not, they will still be filled with the spurs and stumps left by the knife and saw. It would seem desirable, therefore, with such varieties as Burbank, to adopt some renewal method of pruning as is practiced with grapevines. This seems entirely feasible, though I



NURSERY PLUM TREES

Marked to show how they should be cut back when planted

Sophie at the left, Georgeson at the right

ought to add that I know of no one who has yet tested it.

This brings up the whole subject of cutting back. Some growers of Italian Prune and similar Domestica varieties, particularly in Michigan and New York, have contended that the proper management of these trees demanded close heading-in. One may find numbers of orchards which have been treated in this way for a period of years. It must be said that the method has never proven so much better than the usual one as to convince everybody of its superior value. It has its advantages. The trees are maintained within a more manageable compass. They are easier to spray. The fruit is easier to pick. More trees can be handled on an acre. Still, the thrift of the trees seems to be impaired in some cases after a few years, and some growers say that smaller crops are realized. It is really a matter of local and personal practice. It cannot be determined by rule. If a man finds that heading-in is best for him on his farm, he should practice heading-in. If another man learns by experience that it is better under his conditions to let the trees take more their natural form, he should

PLUM TREE (Miner type)
Two years old

let them do so. And the two men should not quarrel over their methods. Both are right. The writer would not for himself practice heading-in with any except some of the too luxuriant-growing varieties of the Japanese class and their hybrids.

Pruning should be done as early in spring as possible, before the sap starts. Summer pinching is a good thing, theoretically, but I do not know of anyone who does it on a scale large enough to prove its general value. The use of the pruning knife and saw on plum trees should be governed by the same principles and by the same good, practical judgment which furnish the basis for successful pruning everywhere. It must be remembered, however, that some varieties of the plum, especially those of the Japanese class, are subject to exudations of gum, which at times are detrimental to the health of the tree. On this account large wounds are especially to be avoided. Severe wounds should always be covered with grafting wax for the same reason.

The formation of a suitable head on a young tree is a matter of some difficulty, especially with the Americanas, and with some other of the native species. The best way to begin is to select only clean, strong, two-year-old trees with good roots, and to plant these with much care, to the end that they make a vigorous, clean growth during the first few years. If a tree becomes stunted when first set out, the head is almost sure to be bad. The best way to do with Americanas and some other related sorts is to cut them back nearly to the ground (being careful, of course, not to get below the inserted bud), and to allow a new shoot to grow. This can be kept straight, and can be cut back for the top whenever desired. Time will be gained in this way if the tree really promises at the outset to be refractory.

The several species, and the varieties of the same species even, differ so much in habit of growth, however, that it is impossible to give any general directions of much value as to the best methods of pruning or of forming heads. This is a subject which needs to be better worked out by local experiment. We should understand that we are only on the threshold of intensive pomology in this country and that the refinements of coming years will make our present practices seem as crude and ignorant as those of a hundred years ago now seem to us.

Spraying.—In spite of the fact that plum culture is more of a specialty than apple culture, and therefore apt to be more refined in its methods, spraying has not established itself so thoroughly as a part of the former as it has with the latter. The reason for this appears to be that the fruit grower has not been able to secure the same positive results in spraying plums as in spraying apples. And the reason for this, in turn, I suspect, is that the problems of plum spraying are more diverse and complicated; that they demand, therefore, more detailed treatment directed to special ends; and that a general, free-for-all spraying is much less likely to touch the right spot. Nevertheless, it has been abundantly shown in particular cases that proper spraying will remedy most of the diseases and stop the work of most of the insects (curculio and gouger excepted) to which the plum is subject. In particular, attention should be directed to the fact that spraying will prevent most of the damage from monilia, or fruit rot, and from the shot-hole fungus. Many of the other troubles are also allayed or overcome. These matters are discussed further in the chapters on diseases and on insects. The plum grower ought to spray, just as much as anyone, but it will require more brains to make his spraying effective.

It should be noted that many of the plums, and particularly the Japanese and Wildgoose varieties, are very readily damaged by applications of bordeaux mixture. The mixture burns the foliage, often causing it to fall. Bordeaux mixture for plums must be weaker than for apples. For Japanese varieties it should be about one-third the strength usually recommended.

Thinning.—Thinning is important with many kinds of fruit, but with none more than with plums. Many varieties, particularly of the Japanese and Americana classes, have a great tendency to overbear. They will set twice to ten times as much fruit as they ought to mature, and do it year after year. Burbank, De Soto and Lombard may be mentioned as examples. This overbearing tends to weaken the trees. In fact, hundreds of trees are killed by it. At the same time it makes the current crops small of fruit and less valuable on the market. One bushel of fine large fruit is worth three bushels of sour, undersized plums, and it is much easier for the tree to produce it. Thinning is a well-recognized practice among the best growers.

The fruit should be thinned immediately after the June drop. The thinning is usually done by hand, and though this is a slow and somewhat expensive business, it is not half so expensive as it is not to do it. Some less fastidious growers thin the fruit roughly by running a fine-toothed garden rake over the branches. This is much better than no thinning at all, but not so good as the hand thinning. When the work is done by hand, the workman must use his judgment as to how many fruits to leave, and which ones. Usually he leaves too many. A good Vermont grower who makes a specialty of fancy Burbanks thins to leave the fruits nine inches apart on the stems. An average of six inches apart may be taken roughly as

a fair standard for most varieties and situations, but this will fluctuate considerably.

Picking and Marketing.—It goes without saying that plums must be hand-picked. At least it ought to. Still, I have seen plums shaken off the trees and sold. That sort of business, though, can hardly be called legitimate. Some of the politicians, even, have found that it does not always pay to "shake the plum tree." In general, it is best to have small market baskets to pick in; and these may be furnished with wire hooks to the handles so as to be hung in the branches of the trees, though a picker will seldom climb into a plum tree. A tall stepladder is best for reaching plum trees, and the basket can be set on top of this. It should be light and yet stable.

Most plums ought to be picked a few days before they are thoroughly ripe, unless they are to be used at home and at once. Even then, care should be taken that they do not become overripe. A plum is better just before it is perfectly ripe than afterward. The Japanese people always eat their plums green, and I know some Americans who have a taste for green plums. Some varieties, especially the Japanese sorts, may be picked a week to two weeks before they are ripe, and stored or shipped to market, and ripen perfectly, with good color and perfect flavor, meanwhile. Some of Mr. Burbank's new hybrids, particularly the varieties Apple and Occident, will keep for several weeks after picking. I have kept specimens of them in good condition in a common living room for three weeks. Plums for jelly should be picked almost as soon as they are full grown and long before they are soft-ripe.

In general, the best package for shipping plums to market is the ten-pound grape basket. Certain special peck baskets and half-bushel baskets are sometimes

used. They are well enough if they strike the fancy of the market, and if the grower can buy them at a satisfactory price. The advantage of the ten-pound grape basket is that everybody knows it, and the shipper can always buy it at a reasonable price. Fancy plums for the fruit-stand trade are sometimes sold in the quart baskets made for strawberries. Much of the fancy fruit from California comes in small special baskets, the individual fruits being wrapped in tissue paper. The Simon plum nearly always comes to our market in that way.

These baskets should be filled in the packing house, and not in the field. The fruit should be brought in in the baskets used by the pickers, and should all be sorted, graded and faced into the packages which are to take it to market. These packages should then be sealed and marked. It will hardly be necessary here to call attention to the value of careful packing, honest facing, clean packages, plain stencils, and all the other details of neatness which have been proven over and over again to be the secrets of profitable fruit selling with all classes of fruits. A man who knows enough to grow a special crop like plums will surely know the importance of these things and will put them into conscientious practice.

XXXI

Pollination

THE study of pollination as a question of practical pomology is something new. Only the most recent books treat of it. Nevertheless, it is now known to be a matter of great importance with many fruits; and with none more than with the plums.

When the native plums first began to be cultivated in this country, their general self-sterility was a drawback which in many cases proved fatal to their success. The settlers in the prairie states found many good plums growing along the river banks, and of these they gathered freely for their own use. When a specially good tree was found, bearing an abundance of extra fine fruit, that tree was marked, and the next spring the settler removed it to his garden on the homestead. But such trees often failed to fruit or proved altogether unsatisfactory when

transplanted in this way. The cause was seldom discovered; but in many cases it was doubtless due to the fact that the tree had been growing with many others and had been well cross-pollinated in its old home on the river bank, but when isolated in the garden its flowers were not fertilized.

Self-sterility.—This condition of self-sterility is very common among plums. It is well-nigh universal with the native species, and the Japanese plums seem to have the same character. The old European or Domestica varieties seem to be less subject to this difficulty, though there is less experimental evidence on record touching their case.

A variety is spoken of as being self-sterile when the pollen from its blossoms fails to fecundate its own ovules. Unless the ovule of the fruit is fertilized,—or fecundated,—it does not develop into a seed; and unless the seed develops, the fruit fails to grow. The crop of fruit thus depends in many cases entirely on proper pollination. This subject has been thoroughly studied in recent years, and our knowledge of it, though still limited, is much greater than it was a decade ago. It will not be necessary here to go into the details of the experiments which have been directed to the study of this question. The practical results are all that are now required.

Cause of self-sterility.—Self-sterility of any variety or tree may be due to any one of several different causes. The most important of these are (a) defective pistils, (b) insufficient pollen, (c) difference in time of maturity between the stigma and the pollen, and (d) impotency of pollen.

Defective pistils.—It has been found that many trees and varieties, especially of native plums, often have imperfect pistils. These imperfections or de-

formities are of various kinds, but the commonest is an atrophied or undeveloped pistil. The female organs of the flower simply fail to grow. They may be found in the center of the blossom, blackened, deformed and shriveled. In a few cases certain trees never produce good pistils. There are a few named varieties in cultivation, merely as curiosities, which never have perfect pistils. The Blackman plum, and Mr. Kerr's Mule are of this sort. It is evident that in such cases no fruit can be formed.

Extensive studies of these defects made at the Vermont Experiment station, however, show that they are seldom of practical consequence. There are usually enough good pistils on any tree of native plums to make a full crop if conditions are favorable for pollination.

Insufficient pollen.—In some cases it doubtless happens that there is a shortage of pollen, and that pollination fails on that account. This occurs very seldom, however, and practically may be left out of account.

Difference in time of maturity between the stigma and the pollen.—The stigma is often ready before the pollen is. This is especially true of the Americana plums. This difference in maturity has been observed to be as much as five days. It varies with the locality and the season. It does not seem to be a constant characteristic of any particular varieties. The pollen is sometimes shed before the stigmas are ready for it; but this occurs so very rarely, according to my observations, that it amounts to nothing. Even when the anthers burst before the stigmas of the same flowers are quite ready, this difference is never more than a few hours; and there seems to be always pollen enough from other flowers on the same tree to effect a thor-

ough pollination, supposing the pollen to be efficient. In the more usual cases in which the stigmas mature first, it seems that an unpollinated stigma may remain receptive for a considerable time. In the case observed, where the stigmas were out five days ahead of the anthers, they remained sticky to the end of the time, were eventually pollinated, and bore an abundant crop of fruit. Difference in time of maturity, therefore, does not seem to be the point of greatest practical consequence.

Impotency of pollen.—Here is where the trouble lies. It is found that the pollen of Wildgoose, for example, though perfectly capable of fertilizing almost any other variety which it reaches, is absolutely useless in fecundating its own blossoms. What is true of Wildgoose is true of almost all the other plums derived from native species, and of many others.

It has already been said above, in various connections, that the native plums are nearly all self-sterile. Robinson is the only exception to this class which I have found in extensive experiments carried on now for five years. Even Robinson does not seem to be thoroughly reliable in self-pollination. The Japanese plums seem to be generally self-sterile in the same way. Several of the Domestica plums seem to be self-fertile, and several seem to be self-sterile. No satisfactory experiments with them are on record. Under the circumstances it is best to hold them all in doubt. All the hybrid plums, so far as I know,—and I have tested a number of them,—are also self-sterile.

We are reduced to this conclusion, then, that, while various plums may sometimes be capable of self-fertilization, they are so nearly always self-sterile that it is the part of wisdom to act in all cases as though self-sterility were certain. Plums should always be

planted on the assumption that they will require cross-pollination.

Choosing varieties for pollination.—The only remaining question is what varieties shall be chosen for mutual cross-fertilization. This involves several considerations. Investigation of the subject shows that this mixing of varieties should not be made carelessly. Some varieties will pollinate each other, while some will not. The selection of varieties for proper cross-pollination should be controlled by certain general principles. The most important matters to be considered in selecting a pollenizer for a given variety seem to be the following four: (a) Blossoming season, (b) mutual affinity, (c) amount of pollen borne, (d) value of the pollenizer as a fruit-bearer.

The first requirement is absolute. If two varieties do not blossom at the same time they cannot pollinate one another. The second one is very important in some cases. The third is apparently less often of practical consequence. The fourth consideration is not a matter of pollination properly, but is often of more practical importance to the fruit grower than some of the others.

Blossoming seasons.—The most important requirement, in order that two varieties shall pollinate each other, is that they blossom at the same time. It is therefore necessary to have a somewhat extensive knowledge of the blossoming seasons of plums. Along with other investigations, I have collected a considerable mass of data relative to this question. The best way to make this available seems to be to tabulate it in some such manner as that shown in the following "blossoming chart," republished from the eleventh annual report of the Vermont Experiment station. In this chart the first column gives the names of the varieties in the order of their blossoming. The second col-

umn indicates the pomological group to which each variety belongs. This is a matter of some importance in selecting varieties for cross-pollination, as will be explained later. The third column shows the number of observations which have been made of the blossoming time of the variety. The heavy horizontal lines represent the periods during which the several varieties are generally in blossom. One can tell, therefore, by comparing two varieties in the chart, whether they blossom nearly enough together to make them safe mutual pollenizers.

This chart is made up largely from notes taken in the orchards of Mr. J. W. Kerr, at Denton, Maryland, which is about the latitude of Washington. This is a convenient latitude, being about midway north and south in the plum-growing area of the continent. Southward from Washington the blossoming season is earlier, and it is also longer. The further south we go the longer the season is; and the further north we go, the shorter it is. We thus find greater difficulty in arranging varieties so as to have them bloom together in the southern states than we do in the northern states, or in Canada.

These facts should be borne in mind in making use of the blossoming chart. It also raises the question as to whether or not a chart made for one locality will be of any use in another latitude. The author has made several careful examinations of this question, from which he has concluded that a general chart of this sort has its limitations, and that a chart made for a particular locality, from blossoming records taken at the same place, is more reliable. In the absence of local notes, however, it seems that a general statement like the one here given is so nearly correct that it can be used without much fear of mistake.

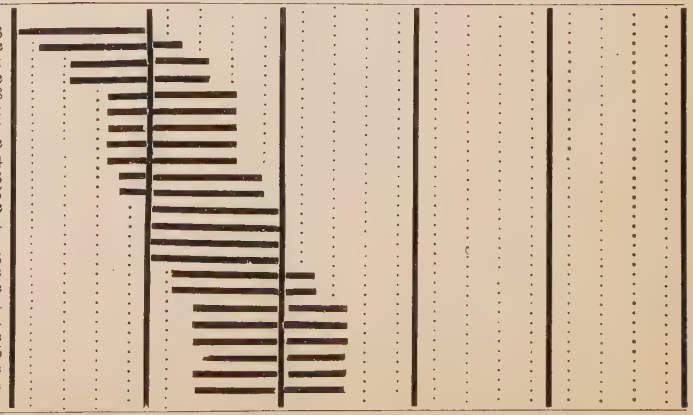
With these explanations the chart is submitted.

BLOSSOMING CHART

VARIETY	GROUP	No. observations
Wickson	Hybrid	3
Red June	Japanese	2
Burbank	do	11
Georgeson	do	2
Abundance	do	8
Aitkin	Nigra	1
Mikado	do	1
Normand	do	2
Satsuma	do	4
Berckmans	do	3
DeCaradeuc	Myrobalan	5
Brill	do	2
Chabot	Japanese	4
Hale	do	1
Uchi Beni	do	3
Kelsey	do	2
Kerr	do	2
Caddo Chief	Chicasaw	4
Early Red	do	4
Engre	Japanese	2
Marianna	Myrobalan	6
Ogeechee	Chicasaw	2
Shiro Smomo	Japanese	2

RELATIVE ORDER OF BLOSSOMING

The vertical dotted lines represent 1-day intervals, the heavy vertical lines 5-day periods. An average blooming period of 5 days (represented by the horizontal lines) is assumed for all varieties.



Blossoming Chart—*Continued*

VARIETY	GROUP	No. observations
Longfruit	Japanese	4
Maru	do	4
Ogon	do	6
Yosebe	do	3
Itasca	Nigra	4
Purple Yosemite	Americana	3
Wazata	Nigra	2
Hattie	Myrobalan	4
Hogg 2	do	2
Manitoba 4	Americana	1
Munson	Chicasaw	2
Robinson	do	5
Colleta	do	4
Excelsior	Hybrid	1
Willard	Japanese	3
Yellow Sweet	Americana	1
Yellow Transparent	Chicasaw	4
Clark	do	2
Emerson	do	2
Strawberry	Watsoni	2
African	Nigra	4
Arkansas Lombard	do	4
Beaty	do	2
Clifford	Wildgoose	2
Deepcreek	Americana	5

RELATIVE ORDER OF BLOSSOMING

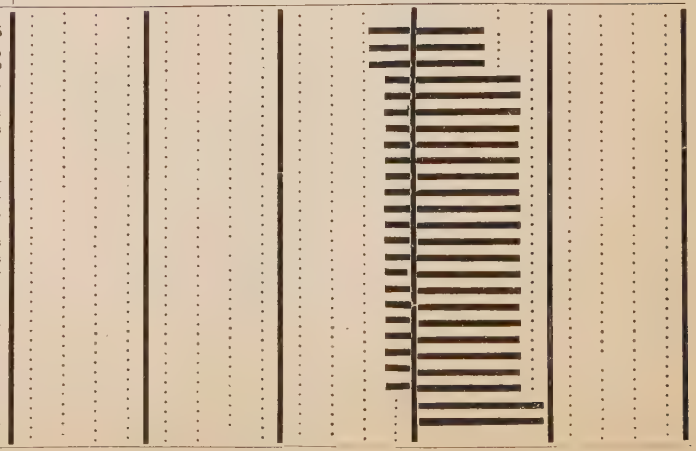
The vertical dotted lines represent 1-day intervals, the heavy vertical lines 5-day periods. An average blooming period of 5 days (represented by the horizontal lines) is assumed for all varieties.

Blossoming Chart—*Continued*

VARIETY	GROUP	No. observations
Newman	Chicasaw	6
Smiley	Wildgoose	3
Wildgoose	do	10
Cherokee	Americana	3
Des Moines	do	1
Drouth King	Wildgoose	2
El Paso	Chicasaw	2
Hughes	do	1
Jefferson	Domestica	1
Lonestar	Chicasaw	4
Milton	Wildgoose	4
Minnetonka	Americana	3
Ocheeda	do	1
Ohio Prolific	Wildgoose	2
Richland	Domestica	2
Rollingstone	Americana	7
Spaulding	Domestica	1
Speer	Americana	5
Texas Bell	Chicasaw	2
Weaver	Americana	5
Wilder	Wildgoose	2
Yellow Panhandle	Watsoni	1
Cheney	Nigra	3
Coe Golden Drop	Domestica	2
Cumberland	Wayland	4

RELATIVE ORDER OF BLOSSOMING

The vertical dotted lines represent 1-day intervals, the heavy vertical lines 5-day periods. An average blooming period of 5 days (represented by the horizontal lines) is assumed for all varieties.

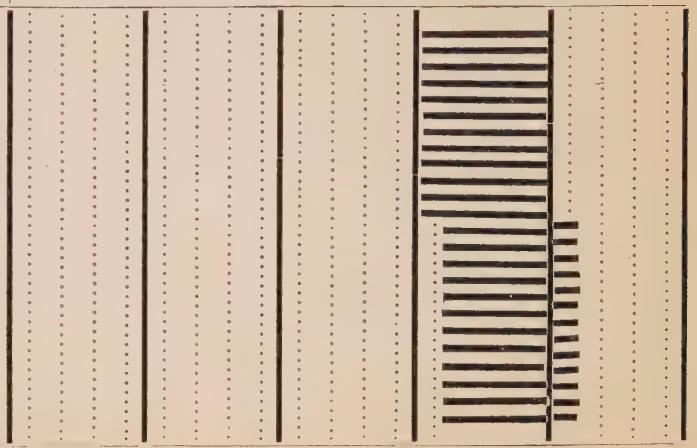


Blossoming Chart—*Continued*

VARIETY	GROUP	No. observations
Freeman	Wildgoose	2
Gaylord	Americana	3
Hiawatha	do	2
Hilltop	do	3
Lombard	Domestica	3
Louisa	Americana	4
Poole Pride	Wildgoose	4
Pottawattamie	Chicasaw	5
Roulette	Wildgoose	3
Schley	do	4
Sugar Drop	Americana	2
Whitaker	Wildgoose	4
De Soto	Americana	5
Grayson	do	1
Hawkeye	do	3
Indian Chief	Wildgoose	4
Juicy	Hybrid	1
Kickapoo	Americana	4
Muncy	do	2
Osage	Wildgoose	2
Parsons	Miner	3
Poole Chili	Domestica	1
Reine Claude	do	2
Rockford	Americana	3
Sucker State	Wayland	3

RELATIVE ORDER OF BLOSSOMING

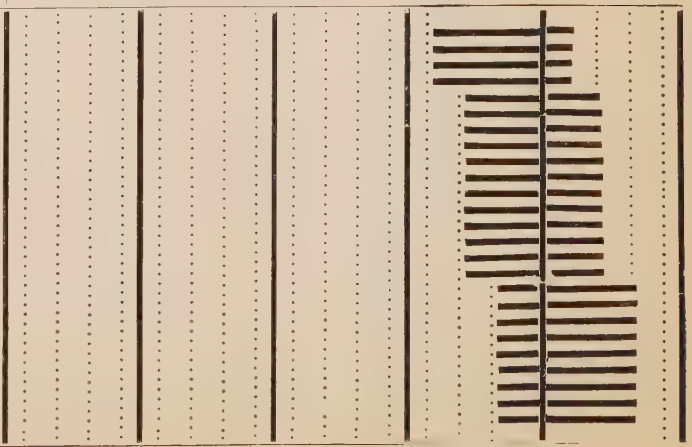
The vertical dotted lines represent 1-day intervals, the heavy vertical lines 5-day periods. An average blooming period of 5 days (represented by the horizontal lines) is assumed for all varieties.



Blossoming Chart—*Continued*

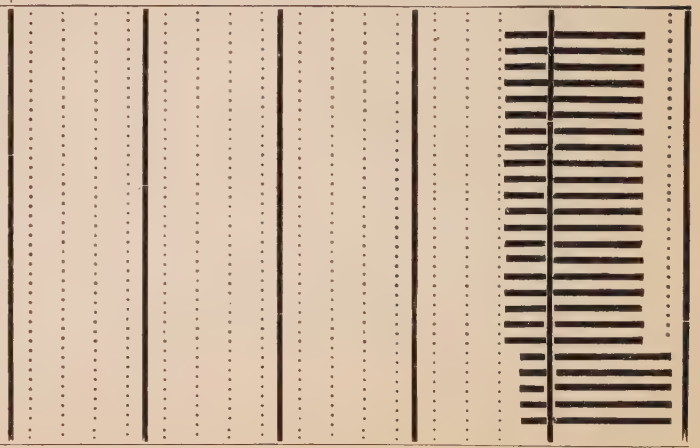
VARIETY	GROUP	No. observations	RELATIVE ORDER OF BLOSSOMING
Van Buren	Americana	2	
Wooten	Wildgoose	2	
Wyant	Americana	3	
Zuzac	do	1	
Clara	?	1	
Clinton	Miner	2	
Columbia	Wayland	1	
Heaton	Americana	2	
Dakota	do	2	
Idall	Miner	3	
Indiana Red	do	4	
Le Duc	Americana	4	
Miner	Miner	5	
Piram	Chicasaw	2	
Silas Wilson	Americana	1	
Sophie	Wildgoose	3	
American Eagle	Americana	5	
California	do	1	
Champion	do	2	
Chas. Downing	Wildgoose	2	
Cluck	Chicasaw	2	
Comfort	Americana	2	
Communia	Domestica	1	
Dunlop 2	Wildgoose	1	
Forest Rose	Miner	4	

The vertical dotted lines represent 1-day intervals, the heavy vertical lines 5-day periods. An average blooming period of 5 days (represented by the horizontal lines) is assumed for all varieties.



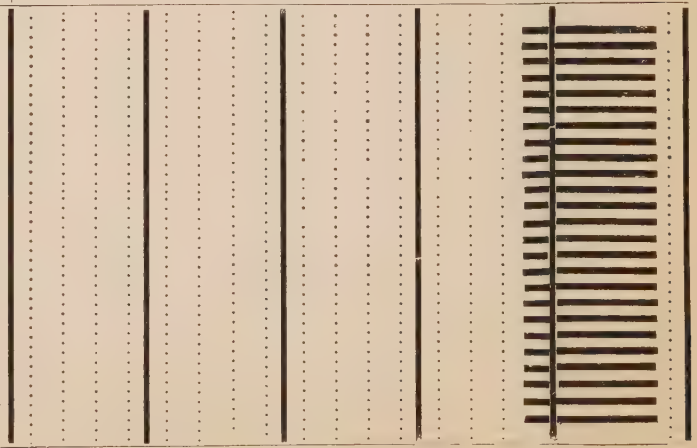
Blossoming Chart—*Continued*

VARIETY	GROUP	No. observations	RELATIVE ORDER OF BLOSSOMING
			The vertical dotted lines represent 1-day intervals, the heavy vertical lines 5-day periods. An average blooming period of 5 days (represented by the horizontal lines) is assumed for all varieties.
Garfield	Wayland	5	
Hammer	Americana	2	
Iris	Miner	4	
James Vick	Wildgoose	2	
Jewell	do	2	
Jones Late	Americana	1	
Kampeska	do	2	
Knudson Peach	do	1	
Kopp	do	2	
Kroh	Wildgoose	1	
Mankato	Americana	2	
Moreman	Wayland	7	
North Carolina	Americana	2	
Old Gold	do	2	
Prairie Flower	Miner	2	
Quaker	Americana	3	
Seper Peach	Nigra	1	
Shropshire Damson	Domestica	1	
Surprise	Miner	2	
Wolf	Americana	7	
Apricot	do	1	
August	do	1	
Bender	do	1	
Carver	do	1	
Colorado Queen	do	2	



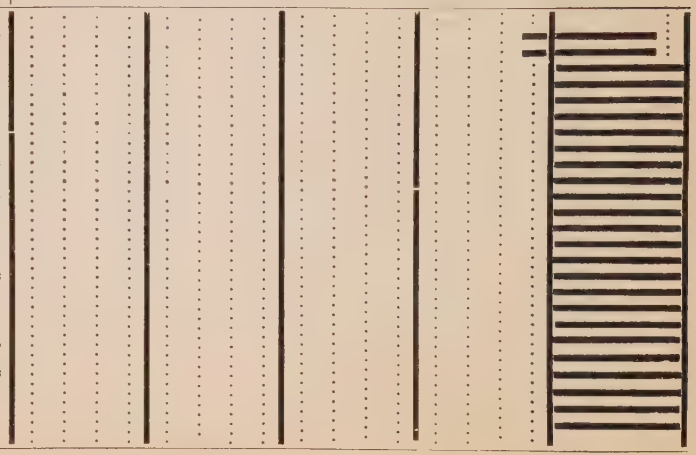
Blossoming Chart—*Continued*

VARIETY	GROUP	No. observations	RELATIVE ORDER OF BLOSSOMING
			The vertical dotted lines represent 1-day intervals, the heavy vertical lines 5-day periods. An average blooming period of 5 days (represented by the horizontal lines) is assumed for all varieties.
Comptine	Americana	1	
Cottrell	do	1	
Crescent City	Miner	2	
Forest Garden	Americana	5	
Golden Beauty	Wayland	8	
Hanson	Americana	2	
Honey	do	2	
Ida	do	1	
Large Red Sweet	do	1	
Macedonia	Wildgoose	3	
Maquoketa	Miner	2	
Marcus	Americana	1	
Maryland	Hybrid	2	
Miller	Americana	2	
Missouri Apricot	Wayland	4	
Moore Arctic	Domestica	3	
Noyes	Miner	2	
Rachael	Americana	4	
Rebecca	do	1	
Red Panhandle	Watsoni	1	
Stoddard	Americana	2	
Van Deman	do	1	
Washington	Domestica	2	
Wayland	Wayland	6	
Wildrose	Americana	1	



Blossoming Chart—*Continued*

VARIETY	GROUP	No. observations	RELATIVE ORDER OF BLOSSOMING
			The vertical dotted lines represent 1-day intervals, the heavy vertical lines 5-day periods. An average blooming period of 5 days (represented by the horizontal lines) is assumed for all varieties.
Williams 7	Americana	2	
Worldbeater	Wayland	2	
Prunus besseyi	Sand Cherry	1	
Cook's Choice	Americana	1	
Compass Cherry	Hybrid	1	
Eldora	?	1	
Forewattamie	Hybrid	1	
Gold (Terry)	Americana	1	
Heideman 88	do	2	
Late Rollingstone	Wildgoose	1	
Illinois Ironclad	Americana	2	
Iona	do	1	
Iowa	do	1	
Irene	do	1	
Italian Prune	Domestica	1	
Kanawha	Wayland	2	
Kieth	Americana	1	
Hollister	do	1	
Leonard	do	1	
Leptune	Wayland	3	
Magnum Bonum	Domestica	1	
Marion	Americana	2	
Moon	do	1	
Moreman Prune	Wayland	1	
Nebraska	Miner	1	

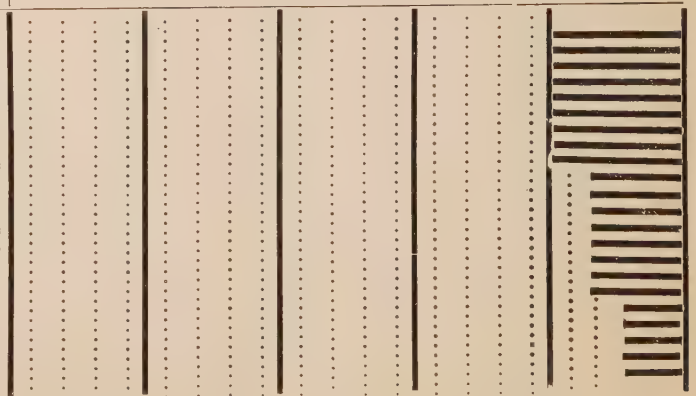


Blossoming Chart—*Continued*

VARIETY	GROUP	No. observations
Newton Egg	Americana	2
Pendent	do	2
Penning Peach	Nigra	1
Reed	Wayland	4
Sloe	Americana	1
Smith Red	Nigra	2
Waraju	Americana	1
Wier Large Red	Miner	1
Wood	Americana	2
Choptank	Wildgoose	1
Davis	do	1
Esther	Miner	1
Galena	Americana	2
Prunus maritima	Maritima	2
Benson	Wayland	1
Reche	Americana	1
Winnebago	do	1
Holt	do	1
Joe Hooker	do	1
Pfeffer Premium	do	1
Shipper's Pride	Domestica	1
Bradshaw	do	1

RELATIVE ORDER OF BLOSSOMING

The vertical dotted lines represent 1-day intervals, the heavy vertical lines 5-day periods. An average blooming period of 5 days (represented by the horizontal lines) is assumed for all varieties.



Mutual affinities.—The question of mutual affinities comes next in order. Do certain varieties have special predilections with respect to pollen from other varieties? This question in the eyes of many plum students has seemed to be of great importance, and the writer confesses once to have held strongly to this prejudice. This theory is not confirmed, however, by the evidence at hand; for while it is certainly true that a given variety will sometimes accept the pollen of its neighbor on the left and will not be pollinated by its neighbor on the right, there seems to be no safe general rule governing these selective affinities. In so far as generalizations may be hazarded in this matter, they may be summarized as follows:

Japanese group.—These plums are readily pollinated by the varieties of almost any other group. The least affinity seems to exist between them and the Domestica varieties. They are easily pollinated by the Simon plum and by varieties of the Myrobalan or Marianna class, but are especially apt to be pollinated by members of the Chicasaw and Wildgoose groups. This is so much the case that where the Japanese varieties grow mixed with natives of the two groups mentioned, almost every one of the seedlings from the Japanese seed will show decidedly the Chicasaw or Wildgoose characteristics. Ever since the Japanese plums were first studied in this country by Bailey, it has been understood that they were closely related botanically to the groups now mentioned as their ready pollenizers.

Chicasaw group.—Many of these varieties are inter-fertile among themselves, as indeed, seems to be the case within most specific groups. They are also readily pollinated by most varieties of the Wildgoose type, or even by those of the Wayland type, where the

latter do not blossom too late. They are usually inter-fertile also with the Japanese plums. Accumulating evidence goes to show that the Chicasaw plums have long been interbreeding with the Americanas in the field, and that the woods are literally full of the resulting hybrids. In fact, the whole so-called Hortulana series, including the Wildgoose, Miner and Wayland groups, seems to have no other pedigree. This would, of course, indicate some considerable degree of affinity between the two groups; but experience in the orchard shows that Americana varieties are seldom the best pollenizers for the Chicasaws, and, vice versa, that the latter are not the most effective with the former. The Chicasaws also blossom earlier than the Americanas in most cases.

Wildgoose group.—Many of these varieties are good mutual pollenizers, though others are not. For instance, Mr. Kerr's experience has shown that Wildgoose, Whitaker and Milton, though blooming simultaneously, will not pollinate one another. Sophie will pollinate either, but neither will pollinate Sophie. Varieties of the Miner and Wayland groups are usually entirely effective when agreeing in blossoming season. Japanese varieties often do the work. The best pollenizers, however, seem to be of the Chicasaw group. Newman, for instance, is a remarkably useful companion for all varieties of the Wildgoose group blossoming at the same time. The Americana varieties are sometimes effective, but are not to be chosen as a rule.

Wayland group.—On account of the late blossoming of most of these varieties, it is difficult to select pollenizers for them from other groups. Such varieties as Miner seem to be satisfactory, however, and the several sorts are generally mutually inter-fertile.

Miner group.—These varieties are best pollinated by the Americanas or by other varieties of the same group.

Americana group.—The sexual affinities of this group with the Chicasaws have already been discussed above. The standing of the Americanas toward the members of the Wildgoose group is much the same. Americana varieties are usually best pollinated by others of the same group or by such sorts as Miner, Maquoketa or Forest Rose, of the Miner group.

Amount of pollen produced.—The question next in order in selecting a pollenizer is the amount of pollen which it produces. A plum to be a good pollenizer should bear an abundance of pollen. Varieties differ in this respect. The same variety may differ also one year with another, or in one locality as compared with another. Beyond the mere fact that these variations are somewhat common, not much is known about this subject. The Chicasaw varieties as a class seem to be good pollen bearers, especially such varieties as Newman, Clark and Pottawattamie. Wildgoose bears abundant pollen under most circumstances, although it is one of the most notably self-sterile varieties in general cultivation. Sophie, on the other hand, belonging to the same group, seems to be deficient in pollen bearing. Some of the hybrid plums just coming into cultivation seem to be especially subject to contabescence, or defectiveness of the male flower organs. Although our knowledge of this subject is seriously limited, it ought to be taken into account, as far as it goes, in selecting varieties for cross-pollination.

Fruiting value.—We now come to the question of the value of the pollenizer as a fruit bearer. It is a good thing for a plum tree to bear pollen, but it is still better if the same tree will bear an abundance of

good fruit. The practical horticulturist is bound to take this view early into account when selecting pollenizers for his orchard. This, of course, involves the whole question of the selection of varieties, which cannot be taken up here, but which is discussed in another chapter. But this matter, with the others foregoing, has been taken into account in making up the recommendations set forth in the subjoined table of pollenizers.

Specific recommendations.—All these various matters discussed above,—blossoming season, affinity, amount of pollen, and value of the pollenizer as a fruit bearer,—have to be taken into account at once in selecting varieties for cross-pollination. It is somewhat difficult to give these each its proper relative weight in making a selection. The careful and studious plum grower will naturally acquaint himself with these conditions, and will thus be able eventually to decide such questions for himself better than anyone can decide them for him. It is for his benefit that so much attention is given in this chapter to explaining the various fundamental principles involved. But the beginner will do better to rely on the judgment of men who are acquainted with the varieties in hand. With this thought in mind, the writer, with the help of Mr. J. W. Kerr, has prepared a tabular list of pollenizers which may be recommended for all the principal native and Japanese varieties. Concerning the Domesticas, a word will be said later. This table, which follows, is republished from the twelfth annual report of the Vermont Experiment station.

POLLENIZING CHART

Variety	Group	Recommended Pollenizers
Abundance...	Japan.....	Burbank, Red June, Chabot, Satsuma, Georgeson
African.....	Chicasaw..	Beaty, Newman, Arkansas.
Aitkin.....	Nigra.....	Burbank, Marianna, Cheney.
American Eagle.....	Americana	Hawkeye, Speer, Wyant, DeSoto, Miner.
Apricot.....	do.....	Stoddard, Wolf, Forest Garden, American Eagle.
Arkansas	Chicasaw.	Newman, Smiley, Wildgoose.
August.....	Nigra.....	Stoddard, Forest Garden, Wolf.
Beaty.....	Chicasaw..	Newman, Wildgoose, Smiley.
Bender.....	Americana	Wolf, Forest Garden, Dunlap, Stoddard.
Benson.....	Wayland..	Wayland, Golden Beauty, Kanawha.
Berckmans...	Japan.....	Burbank, Abundance, Chabot.
Blackhawk....	Americana	American Eagle, Hunt, Stoddard, Wolf.
Brill.....	Myrobalan	Marianna, DeCaradeuc, Burbank.
Burbank.....	Japan.....	Abundance, Chabot, Satsuma, Red June.
Caddo Chief.	Chicasaw..	Early Red, Marianna.
California....	Americana	American Eagle, DeSoto, Hammer, Miner.
Carver.....	do.....	Wolf, Forest Garden, American Eagle, Stoddard.
Chabot.....	Japan.....	Burbank, Abundance, Hale, Kelsey, Kerr.
Champion....	Americana.	American Eagle, Hammer, Miner, DeSoto.
Cheney.....	Nigra.....	Weaver, Gaylord, Forest Garden, Hawkeye, DeSoto.
Cherokee.....	Americana.	Deepcreek, Colorado Queen, Wildgoose, Smiley.
Choptank.....	Wildgoose.	Wayland, Hollister, Idall, Golden Beauty.
Clara.....	Americana	Wyant, Miner, Captain.
Clark.....	Chicasaw..	Newman, Beaty, Smiley, Arkansas.
Clifford.....	do.....	Newman, Munson, Beaty, Arkansas.
Cluck.....	do.....	Wooten, Dunlap, Kroh, Sophie.
Comfort.....	Americana	American Eagle, Kopp, Hammer.
Coletta.....	Chicasaw..	Munson, Clark, Newman, African.
Colorado Queen.....	Americana.	Forest Garden, Wolf, Hilltop, Stoddard.
Comptine.....	do.....	Forest Garden, Wolf, Stoddard.
Cook's Choice	do.....	Stoddard, Forest Garden, Quaker, Kopp, Hammer.
Cottrell.....	do.....	Wolf, Forest Garden, Stoddard.
Crescent City.	Miner.....	Miner, Moreman, Prairie Flower, Maquoketa.
Cumberland...	Wayland..	Whitaker, Indian Chief, Wilder.
Dakota.....	Americana	American Eagle, Hawkeye, DeSoto.
Davis.....	Wildgoose.	Wayland, Choptank, Hollister, Golden Beauty.
DeCaradeuc..	Myrobalan	Marianna, Abundance, Burbank.

Variety	Group	Recommended Pollenizers
Deepcreek....	Americana	Cherokee, Wildgoose, Smiley.
Des Moines..	do.....	Cherokee, Wildgoose, Smiley.
DeSoto.....	do.....	Hawkeye, Weaver, Louisa, Rollingstone.
Downing.....	Wildgoose.	Pottawattamie, Wooten, Cluck, Kroh.
Drouth King.	Chicasaw..	Beaty, Newman, Hughes.
Dunlap.....	Wildgoose	James Vick, Kroh, Moreman, Forest Rose.
Early Red....	Chicasaw..	Caddo Chief, Marianna.
Eldora.....	Americana	Miner, Moreman, August, Wolf.
El Paso.....	Wildgoose.	Wildgoose, Smiley, Clifford, Newman.
Emerson.....	Chicasaw..	Munson, Newman, Clark.
Engre.....	Japan.....	Marianna, Kerr, Chabot, Ogon.
Esther.....	Miner....	Maquoketa, Iris, Surprise, Stoddard.
Excelsior.....	Hybrid....	Munson, Beaty, Newman, Arkansas.
Forest Garden	Americana	Stoddard, American Eagle, Kopp, Quaker.
Forest Rose..	Miner....	Miner, Hammer, Prairie Flower.
Forewattamie	Hybrid...	Wayland, Golden Beauty, Choptank.
Freeman.....	Wildgoose.	Pottawattamie, Schley, Wilder, Cumberland.
Galena.....	Americana	Stoddard, Holt, Iowa, Illinois Ironclad.
Garfield.....	Wayland..	Miner, Forest Rose, Golden Beauty, Missouri Apricot.
Gaylord.....	Americana	DeSoto, Rollingstone, Cheney, Hawkeye.
Gold (Terry).	do.....	Stoddard, Forest Garden, Quaker, Late Rollingstone.
Golden.....	Hybrid....	Dunlap, Kroh, James Vick.
Golden Beauty	Wayland..	Wayland, Moreman, Kroh, Miner.
Grayson.....	Americana	DeSoto, Weaver, Hawkeye.
Hale.....	Japan.....	Chabot, Kerr, Kelsey, Uchi Beni.
Hammer.....	Americana	Miner, Moreman, Kopp, American Eagle, Van Deman.
Hanson.....	do.....	American Eagle, Stoddard, Forest Garden, Clifford.
Hattie.....	Myrobalan	Itasca, Purple Yosemite, Munson.
Hawkeye.....	Americana	DeSoto, Weaver, Cheney, American Eagle.
Heaton.....	do.....	American Eagle, Hawkeye, DeSoto.
Hiawatha.....	do.....	DeSoto, Hawkeye, Rollingstone, Benson, Williams' 17.
Hilltop	do.....	DeSoto, Hawkeye, Rollingstone.
Hollister.....	Wildgoose.	Choptank, Wayland, Moreman, Macedonia.
Holt.....	Americana	Iowa, Pfeffer Premium, Stoddard, Muncy.
Honey.....	do.....	Stoddard, American Eagle, Forest Garden.
Hughes.....	Chicasaw..	Wildgoose, Newman, Smiley, El Paso.
Ida.....	Americana	Stoddard, American Eagle, Forest Garden.
Idall.....	Miner....	Miner, American Eagle, Wyant, Silas Wilson.
Illinois Ironclad ...	Americana	Stoddard, Wolf, Forest Garden, Kopp.
Indiana Red..	Miner....	Miner, Idall, American Eagle, Wyant.
Indian Chief.	Wildgoose.	Pottawattamie, Wooten, Cumberland.
Iona.....	Americana	Wolf, Quaker, Stoddard, Forest Garden.
Iowa.....	do.....	Stoddard, Hammer, Quaker, Forest Garden.
Irene.....	do.....	Stoddard, Hammer, Forest Garden, Quaker.
Iris.....	Miner.....	Miner, Hammer, Moreman, Prairie Flower, Forest Rose.
Itasca.....	Nigra.....	Wazata, Manitoba 4.
James Vick...	Wildgoose.	Moreman, Golden Beauty, Dunlap.
Jewell.....	do.....	Moreman, Golden Beauty, Dunlap.
Joe Hooker...	Americana.	Holt, Iowa, Kieth.
Jones Late...	do.....	Kopp, Hammer, Miner, American Eagle.
Juicy.....	Hybrid....	Pottawattamie, Whitaker, Wooten.
Kampeska....	Americana.	Hammer, Kopp, Miner, Forest Garden, Leonard.

Variety	Group	Recommended Pollenizers
Kanawha.....	Wayland..	Golden Beauty, Moreman, Wayland.
Kelsey.....	Japanese..	Hale, Satsuma, Marianna, Ogon.
Kerr.....	do.....	Chabot, Maru, Ogon, Yosebe, Georgeson.
Kickapoo.....	Americana	Hawkeye, DeSoto, Wyant, American Eagle.
Kieth.....	do.....	Stoddard, Wolf, Forest Garden, Cook's Choice.
Knudson Peach.....	do.....	Forest Garden, Hammer, Kopp, Miner.
Kopp.....	do.....	Forest Garden, Hammer, American Eagle.
Kroh.....	Wildgoose.	Cluck, James Vick, Wayland, Golden Beauty.
Large Red Sweet.....	Americana	Stoddard, American Eagle, Forest Garden.
Late Rollingstone	do.....	Gaylord, Wolf, Stoddard, Forest Garden.
Le Duc.....	do.....	American Eagle, Hammer, Kopp, Miner.
Leonard.....	do.....	Stoddard, Wolf, Forest Garden, Quaker.
Leptune.....	Wayland..	Wayland, Kanawha, Golden Beauty.
Lonestar.....	Chicasaw.	Newman, Wildgoose, Milton.
Louisa.....	Americana	DeSoto, Weaver, Hawkeye, Rockford, Rollingstone.
Macedonia....	Wildgoose	Wayland, Dunlap, James Vick.
Mankato.....	Americana.	Forest Garden, Miner, Hammer, Iowa.
Maquoketa....	Miner.....	Miner, Prairie Flower, Surprise.
Marcus.....	Americana	Stoddard, Forest Garden, Kopp, Quaker.
Marion.....	do.....	Forest Garden, Stoddard, Quaker.
Miller.....	do.....	Stoddard, Forest Garden, American Eagle, Kopp.
Milton.....	Wildgoose.	Newman, Smiley, Clark, Kroh.
Miner.....	Miner.....	Hammer, Indian Chief, American Eagle, Forest Rose.
Minnetonka...	Americana	Ocheeda, Rollingstone, Weaver, Speer.
Missouri Apricot....	Wayland..	Golden Beauty, Wayland, Kanawha.
Moon.....	Americana	Forest Garden, Stoddard, Wolf.
Moreman	Wayland..	Miner, Wayland, Golden Beauty, Wolf.
Moreman Cherry.....	do.....	Wayland, Golden Beauty, Kanawha, Cluck.
Muncy.....	Americana	Hawkeye, DeSoto, American Eagle, Wyant.
Munson.....	Chicasaw..	Newman, Clark, Emerson, James Vick.
Nebraska.....	Miner.....	Prairie Flower, Iris, Esther, Choptank.
Newman.....	Chicasaw..	Wildgoose, Smiley, Clifford.
Newton Egg..	Americana	Iowa, Stoddard, Forest Garden.
Nimon.....	Wayland..	Miner, Wayland, Golden Beauty.
Normand.....	Japanese..	Burbank, Abundance, Chabot.
North Carolina	Americana	Kopp, Hammer, Forest Garden, Miner.
Noyes.....	Miner....	Miner, Prairie Flower, Forest Rose.
Ocheeda.....	Americana	Minnetonka, Rollingstone, Weaver.
Ohio Prolific..	Wildgoose.	Newman, Smiley, Pottawattamie.
Old Gold.....	Americana	American Eagle, Hammer, Kopp, Quaker.
Osage.....	Wildgoose.	El Paso, Pottawattamie, Wooten, Downing.
Pendent.....	Nigra.....	Stoddard, Forest Garden, Iowa, Holt.
Penning Peach	Americana	Holt, Joe Hooker, Stoddard, Wolf, Smith Red.
Pfeffer Premium.....	do.....	Joe Hooker, Holt, Iowa, Marion.
Piram.....	Chicasaw..	Pottawattamie, Wooten, Downing.
Pottawattamie.	do.....	Whitaker, Indian Chief, Wooten.
Prairie Flower	Miner....	Miner, Moreman, Rockford, Quaker.
Purple Yosemite...	Americana	Wazata, Itaska, Manitoba 4.
Quaker.....	do.....	American Eagle, Kopp, Hammer, Forest Garden.

Variety	Group	Recommended Pollenizers
Rachael.....	Americana	Stoddard, Forest Garden, American Eagle.
Rebecca.....	do.....	Stoddard, Forest Garden, American Eagle.
Reche.....	do.....	Holt, Stoddard, Joe Hooker, Wood.
Red June.....	Japanese..	Burbank, Abundance, Chabot, Satsuma.
Reed.....	Wayland..	Wayland, Golden Beauty, Kanawha, Leptune.
Robinson.....	Chicasaw..	Munson, Coletta, Clark, Newman.
Rockford.....	Americana	American Eagle, Wyant, DeSoto, Miner.
Rollingstone..	do.....	Weaver, Minnetonka, Winnebago, Moon.
Roulette.....	Wildgoose.	Schley, Pottawattamie, Whitaker, Wooten.
Satsuma.....	Japanese..	Burbank, Abundance, Red June, Chabot.
Schley.....	Wildgoose.	African, Whitaker, Pottawattamie, Wooten.
Seper Peach..	Nigra.....	Forest Garden, August, Stoddard.
Surprise.....	Miner....	Miner, Forest Rose, Prairie Flower, Quaker.
Silas Wilson.	Americana	American Eagle, Hammer, Kopp, Quaker.
Sloe.....	do.....	Iowa, Holt, Stoddard, Wood.
Smiley.....	Wildgoose.	Wildgoose, Newman, Beaty, Colorado Queen.
Smith Red...	Nigra.....	Marion, Kieth, Iowa, Wood.
Sophie.....	Wildgoose	Smiley, Cluck, Golden Beauty, Wayland.
Speer.....	Americana	Weaver, Rollingstone, Cheney.
Stoddard.....	do.....	Forest Garden, Quaker, Holt, Hammer.
Strawberry...	Watsoni...	Newman, Beaty, Arkansas Lombard.
Sucker State.	Wayland..	Whitaker, Cumberland, Wooten, Miner.
Texas Belle..	Chicasaw.	Lone Star, Pottawattamie, Milton, Wildgoose.
Van Buren...	Americana	American Eagle, Miner, Hawkeye, Champion.
Van Deman..	do.....	Stoddard, Forest Garden, American Eagle, Hammer.
Waraju.....	do.....	Holt, Wood, Kieth, Joe Hooker.
Wayland.....	Wayland..	Golden Beauty, Kanawha, Moreman, Miner.
Wazata.....	Nigra....	Itaska, Purple Yosemite, Manitoba 4.
Weaver.....	Americana	Rollingstone, DeSoto, Louisa, Gaylord.
Whitaker.....	Wildgoose.	Newman, Kroh, Smiley, Sophie.
Wickson.....	Hybrid...	Red June, Burbank, Abundance, Georgeson, Chabot.
Wier Large Red.	Miner....	Nebraska, Stoddard, Maquoketa.
Wilder.....	Wildgoose.	Pottawattamie, Freeman, Cumberland, Kroh.
Wildgoose....	do.....	Newman, Smiley, Clark, Munson, very good. Not Miner nor Moreman.
Wildrose.....	Americana	Stoddard, Forest Garden, American Eagle.
Willard.....	Japanese..	Yosebe, Ogon, Emerson.
Winnebago...	Americana	Holt, Stoddard, Wood, Joe Hooker.
Wyant.....	do.....	American Eagle, DeSoto, Hawkeye.
Wolf.....	do.....	Stoddard, American Eagle, Quaker, Forest Garden.
Wood.....	do.....	Stoddard, Wolf, Holt, Iowa.
Wooten.....	Wildgoose.	Pottawattamie, Miner, Whitaker.
Yellow Sweet	Americana.	Purple Yosemite, Deepcreek.
Yellow Transparent	Chicasaw.	Munson, Newman, Early Red, Clark, Emerson.
Yosebe.....	Japanese..	Ogon, Kerr, Maru.

The Domesticas and the Damsons.—With respect to the Domesticas, which have been pretty much ignored in the foregoing discussion, a word or two more should be said. The varieties of this group, including also the Damsons, do not seem to be so generally self-sterile as other plums. However, unless a given variety is positively known to be self-fertile in the locality where it is to be planted, it would be better to mix it with some suitable pollenizer. In selecting pollenizers for Domesticas and Damsons, it would probably be best to choose from the same groups. In the northern states, where alone (excepting in California) these varieties are grown, nearly all the Domesticas and Damsons blossom so closely together as to make this safe.

Agencies of pollination.—In the plum orchard pollination is usually effected by insects, especially by bees, and more particularly by the common honey bee. This one species seems to be far more useful in distributing pollen than all other agencies combined. The wind may do something in the way of carrying pollen. Probably it does at times, though the experiments which I have made on this subject have pointed to the contrary conclusion.

June drop.—At this point attention should be called to the phenomenon known among plum and peach growers as the "June drop." It seems to be always the case that a large proportion,—from twenty-five to one hundred per cent,—of the fruit which apparently sets falls off just as it should begin to grow. This fall of young fruits usually occurs within a short space of time, and comes, in medium latitudes, some time in June.

Various explanations of the June drop have been suggested. The causes usually assigned are (1) non-pollination, (2) curculio work, and (3) the struggle for

existence. All these doubtless operate, though all vary greatly with circumstances. In some instances one plays the most important part; in other cases another cause has the greatest effect.

Studies made at the Vermont Experiment station show that lack of pollination is certainly one of the causes. A large number of the young plums which are imperfectly pollinated at blossoming time never begin to develop, but fall off within a week or ten days. A certain number, however,—usually a smaller number,—remain on the tree and begin to grow. These may hang on till they are half or two-thirds grown, but presently they stop growing, turn yellow, and fall. This may occur from lack of pollination alone. Perhaps such fruits are stimulated to a partial development by a partial pollination. Perhaps they begin their growth for some other reason. At any rate, they do not reach maturity, but instead come to the ground with the June drop.

Examination of specimens leaves no room for doubt that the curculio is also a factor in the June drop of plums. The curculio sometimes works directly into the seed, causing the certain and early fall of the fruit. In other cases the larva works only in the flesh just outside the stone. The fruit usually shows symptoms of premature ripening, and earlier or later is apt to fall. Many curculio-infested fruits remain on the tree till ripening time, however. The majority of the curculio drops seem to come toward the end of the season, mostly in July, whereas the non-pollinated drops seem to fall mostly in June.

The third factor mentioned remains to be considered. Numbers of young plums fall even though well pollinated and though unattacked by the curculio. When plums set too thickly on the fruit spurs and when they are not properly thinned by other causes,

there immediately begins a strenuous struggle for existence. There is not room for all. The strongest only can survive. The weakest are soon robbed of their share of nourishment and are presently literally crowded off the stems by their jostling brothers. This struggle is severest in the latter part of May and the early part of June, and the rejected weaklings figure conspicuously in the June drops. The struggle is less of course as the setting of plums is smaller and its intensity is influenced more or less by other causes, as food supply and the operation of the two causes of drops already considered.

Leaving aside the drops which immediately follow the falling of the blossom and which are not June drops, the three causes enumerated usually operate in the following order: Non-pollination, struggle for existence, curculio work. The effects of the curculio work are thus apt to occur after other causes have reduced the crop to what the trees could comfortably carry.

The plum grower may therefore leave out of consideration the struggle for existence. He need not worry about non-pollination except in those cases of self-sterility and improper adjustment of varieties which would come to his attention without reference to the June drop. He should, however, give serious attention to the curculio, for it is this factor which may oftenest reduce a fair crop to none at all.

XXXII

Geography and Climatology

THE relationship existing between the fruit tree and the climate in which it lives is evidently one of the most important practical and scientific matters connected with fruit growing. Yet only in a few instances has this relationship been carefully investigated. The only part of this series of problems which has received general attention is the matter of hardiness. Ever since the beginning of tree planting in America, horticulturists have been asking, Is this variety hardy? Will it stand our winters? We have thus accumulated a large mass of information on this particular point, most of which, however, is totally undigested and incapable of anything but a local application.

With respect to the hardiness of plums, it is to be

noted that we have greater complications than with any other class of fruits, from the fact that the plums belong to so many different species, and from the additional fact that these species have been badly mixed by natural and artificial hybridization. In a general way, however, we understand the capabilities and requirements of the several groups of varieties; and these requirements may be more definitely stated according as a given group is more homogeneous and invariable. The Americana group is the most hardy and the Chicasaws are generally tender in the northern states. The general range of the several groups has been indicated in the separate chapters where those groups are discussed, and need be renewed here only in a general way.

Two years ago the writer made a special investigation of the hardiness of plums, the results of which were published in the eleventh report of the Vermont Experiment station. Some of the notes given there may be conveniently reproduced here.

Largely through the aid of expert correspondents, statistics were gathered concerning the hardiness of representative varieties in the leading groups. These are summarized in the following table.

Notes of hardiness can be best generalized on a map, however. If we take up the principal groups in order, we shall find it possible to draw certain lines of northern limit which indicate in a rough way the horticultural range of the varieties.

Domestica group.—Taking Lombard as a representative of this group and examining carefully the reports of correspondents, the results published by the experiment stations and horticultural societies, and taking practical experience into account, we may safely trace the northern limit of Lombard by the upper line in the accompanying map.

TABLE

GIVING A GENERAL VIEW OF THE HARDINESS OF SEVERAL REPRESENTATIVE VARIETIES OF PLUMS AT VARIOUS PLACES

h—hardy; hh—half hardy; t—tender

	Ohio	Indiana	Illinois	Kansas	Colorado	Nebraska	Western New York	Vermont	Ontario	Maine	Wisconsin	Iowa	Minnesota
Domestica Group													
Lombard	h	h	h	h	h	h	h	h	h	h	h	h	hh
Green Gage	h	h	h	h	h	h	h	h	hh	h	hh	h	t
Damson	h	h	h	h	h	h	h	h	h	h	h	h	t
Bradshaw	h	h	t	hh	h	h	hh	hh	hh	hh	hh	hh	t
Japanese Group													
Abundance	h	h	h	h	hh	h	h	h	h	hh	hh	hh	t
Burbank	h	h	h	h	h	h	h	h	h	hh	hh	hh	t
Satsuma	hh	h	h	hh	t	h	hh	hh	hh	t	t	hh	t
Kelsey	t	?	t	hh	t	t	t	t	t	t	t	t	t
Americana Group													
De Soto	h	h	h	h	h	h	h	h	h	h	h	h	h
Hawkeye	h	h	h	h	h	h	h	h	h	h	h	h	h
Wolf	h	h	h	h	h	h	h	h	h	h	h	h	h
Wildgoose Group													
Wildgoose	h	h	h	h	h	h	h	h	hh	t	h	h	t
Poole Pride	h	h	h	h	h	h	h	?	hh	t	h	h	t
Wayland Group													
Moreman	h	h	h	h	h	h	h	h	h	?	h	h	....
Golden Beauty	?	h	h	h	h	?	hh	h?	?	?	hh	h	....
Chicasaw Group													
Pottawattamie	?	h	h	h	h	h	h	h	hh	t	h	h	h
Newman	?	h	h	h	?	?	h	?	t	t	hh	t	t

Bradshaw seems to be distinctly more tender than Lombard, especially in fruit buds, so that its northern limit runs considerably to the south of the latter. Still, it is sometimes fruited in favorable situations and good plum years almost as far north as Lombard. Most of the varieties of *Prunus domestica* have more nearly the hardiness of Lombard.

The Damsons.—These seem to be hardier than Lombard and most others of the Domestica class. In

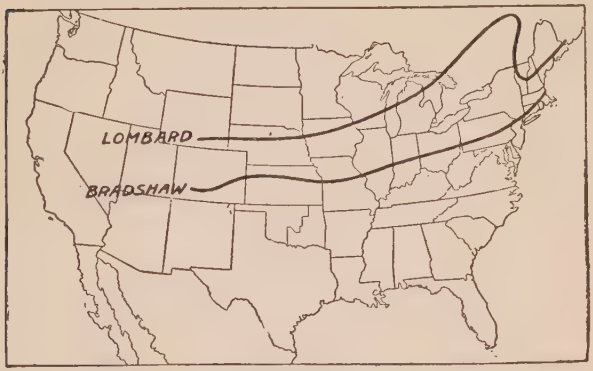


Diagram Showing Approximate Northern Limit of the Successful Culture of Lombard and Bradshaw Plums.

fact, Mr. John Craig, formerly Dominion horticulturist, informs me that "in the valley of the lower St. Lawrence in northeastern Quebec, where the Damsons have been cultivated since the first settlement of the country, they have developed a 'botanical variety' with a much more extended range northward than the ordinary varieties of *Prunus domestica*."

Japanese group.—The Japanese varieties vary greatly in hardiness, and they have not been long enough in cultivation in this country to have had their

limits exactly determined. The general northward range of two well-known varieties is shown in the map,

Kelsey is doubtless the most tender of the commoner varieties. Most of those generally grown approach very nearly the hardiness of Burbank.

Americana group.—These are hardy anywhere where agriculture can be practiced.

Nigra group.—These varieties have the same range in cultivation as those of the preceding group.

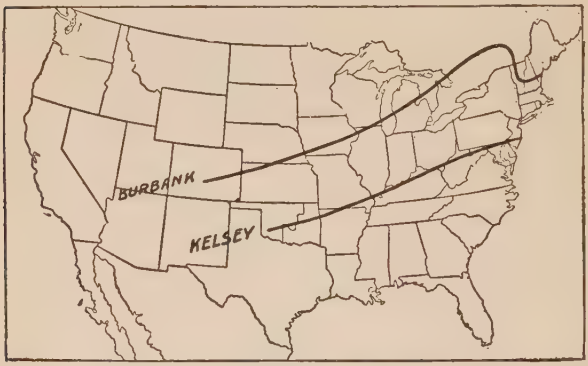


Diagram Showing Approximate Northern Limit of the Successful Culture of Burbank and Kelsey Plums.

Wildgoose group.—Wildgoose, the best-known variety of the group, has been widely tested and is known to succeed fairly well to the south of the line shown on the map, on the following page, and to be unreliable north of that line.

Several of the other varieties of this group seem to come up to this line fairly well.

Miner group.—These varieties are almost as hardy as the Americanas, but not quite. They succeed as

far north as Iowa, Minnesota, Wisconsin, Ontario and Vermont.

Wayland group.—An opinion seems to prevail among pomologists that the Wayland-like varieties as a whole are somewhat less hardy than those of the better-known Wildgoose group. Statistics give no ground for this belief. Several varieties are of southern origin, and one or two, like the common Golden Beauty, appear to be slightly less hardy than Wild- seems to be true of Wayland and others. Even Golden

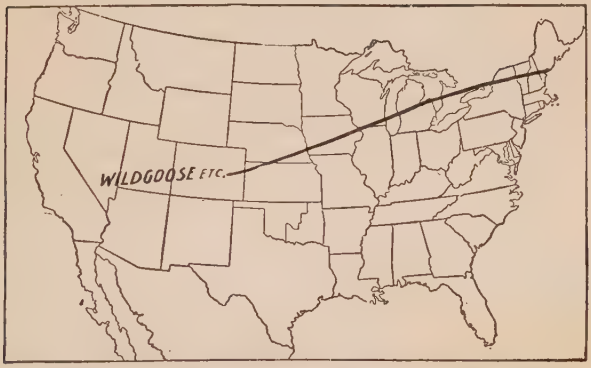


Diagram Showing Approximate Northern Limit of the Successful Culture of Wildgoose and Other Plums.

be measurably hardier than Wildgoose, and the same seems to be true of Wayland and others. Even Golden Beauty, which has been growing three years on the grounds of the Vermont Experiment station, seems to be as hardy here as leading Japanese, Domestica and Wildgoose varieties. It seems fair, therefore, for the present at least, to let the limit traced for Wildgoose stand also for the varieties of the Wayland group.

Chicasaw group.—These are generally held to be our most tender varieties. Pottawattamie, however,

originated in Iowa, and seems to be reliably hardy in the southern part of that state, and in the Champlain valley in Vermont. Other varieties, as Newman, are hardy well northward in New York and Massachusetts, so that we may fairly say that the group has almost the same northward range as the Wildgoose group.

COMMERCIAL RANGE

If we examine the areas of commercial culture of groups and varieties, however, we shall find that they bear no close correspondence to the geographical ranges. The areas of profitable culture are determined by many factors, among which hardiness is not of first importance. Frequently a given variety, or a few varieties, have a very local favor. They are esteemed by a few people in some particular town. In other cases, soil conditions, the presence of bodies of water, or transportation facilities, determine the culture of plums.

The Domesticas are the leading plums in western New York, on the Pacific coast, and in a few back-country towns in New England, where nothing newer has been fairly tested. The great prune industry of the Pacific slope is dependent wholly on the Domesticas. Eastward from the Rocky mountains the Domesticas are of paramount importance only in western New York and neighboring areas in upper Ontario and Michigan. Here they flourish. Here other plums do not seem to thrive. It is surprising how worthless some of the best natives seem to be in that section; and even the Japanese sorts do not make a creditable appearance. This makes the Domesticas all the more exclusively the plums of this particular region.

The Americanas are the principal reliance of the dry, cold prairie region of the north-central west, in-

cluding Wisconsin, Iowa, Minnesota, the Dakotas, Manitoba and neighboring areas. They also do well in Quebec, Ontario, Vermont and the northeast generally, though they do not seem to thrive with quite the same fervor as in the region just described. Perhaps this is because less attention has been given to them.

The Wildgoose varieties are favorites in many central and south-central parts of the continent. The Chicasaws are commercially profitable in some of the southern states. Varieties of the Wayland class are less well known, but are especially adapted to certain parts of Texas, Alabama and other southern states. They have been favorably reported from Maryland and Missouri.

In general it seems safe to say that each locality will be best served by some few varieties, and that these will succeed much better than others. The problems of variety adaptation in plum culture are more intricate and appear to be more local than with any other group of fruits. This means, in practical application, that the plum amateur must be more of an experimentalist than the ordinary horticulturist; and also that the beginner must pay more close attention to the varieties which have proved successful in his own locality and give little heed to reports of success or failure in other parts of the country.

PHENOLOGY

Some of the most curious and valuable points connected with the relationship of fruit trees to their climatic environment are those connected with the seasons of blossoming, leafing and ripening. The importance of a careful study of blossoming seasons is explained in the chapter on pollination; and season

of maturity is always understood to be of great practical consequence. All these things have a definite relationship to climatic conditions; and it seems probable that any one phenomenon, like the blossoming of Abundance, or the maturity of Green Gage, might be so carefully studied as to discover just what the conditions are on which it is dependent. The trouble is that no such case has ever been sufficiently studied. It seems probable that the sum total of heat received from the air, more than anything else, determines when a given tree shall open its blossoms or mature its fruit. But this is too complicated a question for discussion here.*

Before leaving this subject finally, however, it will be interesting to note that the same plant will behave differently in different climates. With plum trees this is most noticeable in the relative seasons of flowering and leafage. In southern latitudes the flowers appear before the leaves, often when the leaf buds are scarce bursting. The leaves come on one, two or even three weeks later. In northern latitudes, on the other hand, flowers and leaves come out together. In some cases the first leaves may be seen nearly full grown on the same twigs with the freshly-expanded flowers. This difference may be observed in any variety. It sometimes proves puzzling to the pomologist who tries to identify a tree in one locality from his experience with the same variety in a different latitude.

---

*The author has given a general view of this subject, with certain computations, in Vermont Experiment station Report, 11:263. 1898.

XXXIII

Diseases of the Plum

PLUM trees and fruit are subject to several diseases, of which only a few are of special seriousness. The worst ones are ripe rot (monilia) and black knot. These vary greatly in virulence according to season, weather, locality and varieties. Reasonable care will prevent serious damage by any of them.

Ripe rot (*Monilia fructigena*).—This is a fungous disease which shows most conspicuously in the rotting of the fruit at ripening time or just before; but it also attacks the twigs and young growth of the trees, doing equal or greater damage there. When this rot occurs on ripening fruit, the skin turns black or brown and is finally covered, partially or wholly, by small pustules or little bunches of spores, somewhat smaller than the head of a pin.

At blossoming time, however, one may frequently find buds and blossoms and sometimes young leaves, blackened as though struck by frost. This usually proves to be the work of the monilia. The buds and fruit spurs are sometimes entirely killed in early spring and are often seriously weakened.

When the twigs, buds and fruit spurs are attacked in this way, there often ensues a sort of gummosis. There will be found exuding from the buds and from the axils of the spurs small masses of white gum, looking very much like those found on fruit attacked by curculio. In bad cases the monilia and the gummosis together kill the twigs and younger branches altogether.

The most conspicuous damage caused by this fungus is that on the fruit. If the weather happens to be damp and warm—"muggy"—toward ripening time, the rot proceeds with terrible rapidity, destroying ten, twenty or fifty per cent. of the crop in a single day. What is even worse, the fruit rots after picking, so that plums sent to market in perfectly sound condition may arrive at their destination a day or two later so badly spoiled as to be wholly unsalable. This latter feature of the trouble may be minimized by careful sorting at the time of packing, taking care that no plums which show the rot are put in, and prompt shipment with good ventilation. First-class cold storage will also delay the progress of the rot to a considerable extent, but will not wholly stop it.

The disease is caused by a fungus, as has already been said. The spores of this fungus gain access to the tree very early in spring, at the time the buds start, or even before. They lodge in the bud scales of the leaf and flower buds, germinate there and quickly penetrate the tissues of the twig itself. It will readily be seen that any remedy to be effective must be used

before the fungus becomes established within the tissues of the plant. The best treatment, in fact, is to spray very thoroughly with strong bordeaux mixture or pure blue vitriol solution early in the spring, just before the buds start. These two points are to be insisted on,—thorough early spraying with a strong solution. The mixture can be much stronger than that used in summer, for at the time of this spraying there are no leaves out and consequently there is no danger of damage to foliage.

Toward the close of the blossoming season the trees should be carefully examined. If there are dead, dying and discolored flowers, blackened fruit spurs, spots of gummosis and other indications of the work of the monilia, another spraying is necessary.

In general it may be said that two or three sprayings with bordeaux mixture are necessary in dealing with this disease. Two should be given in any case, as directed above, and three should be given if the disease is especially threatening. Inasmuch as these three, or more, sprayings give equal opportunity for combating several other fungous pests and certain insect enemies, the plum grower has the greater reason to be prompt and thorough.

It should be noted here, though it is mentioned elsewhere, that bordeaux mixture used on plum trees after they are in leaf must be weaker than that usually recommended for apple trees. Damage from strong bordeaux mixture is especially apt to occur on Japanese plums.

When for lack of spraying, or in spite of spraying, the disease runs its course, the visible evidences of it remain in blackened twigs and rotted fruit. The fruits which fall to the ground rot or dry there, while the fungus which has killed them matures innumerable spores for the perpetuation of the species. Frequently

the diseased fruits do not fall from the trees, but shrivel and blacken and remain hanging to the dead or dying fruit spur all the winter through. These mummied fruits are perfect masses of fungus spores.

The dark-colored spores formed at this season are able to live over winter in perfect condition for the renewal of the fungous growth the succeeding spring. It becomes an important preventive measure, therefore, to destroy these spore-infested mummied fruits, the rotted fruits on the ground, and the dead twigs in the tree. The dead parts should be cut out and burned; and the dried or rotted fruits should be carefully gathered and likewise cremated. This is important and worth while. Such treatment followed by proper spraying will practically eliminate the monilia from the list of plum troubles.

The same disease works on peaches, apricots and cherries. It is desirable, therefore, in treating plums, to extend the same preventive and remedial measures to all other stone fruits in the same orchard.

Black knot.—This disease, which rejoices in the scientific name of *Plowrightia morbosa*, is especially bad in neglected orchards, and in trees growing along roadsides. In these trees, outside cultivation, it fairly revels. Here it breeds, and from here it spreads to neighboring orchards. It occurs on all sorts of plums (contrary to the statements of the tree peddler), sometimes on the cherry, and often on wild trees of black cherry and choke cherry.

It is worse on some varieties of plums than on others, but this difference is not marked. When the Japanese plums were all novelties in this country it was freely claimed that they were proof against black knot. They are not. They are, perhaps, less susceptible to its attacks than some other plums are; but this difference of susceptibility is not sufficiently marked

to be of any practical consequence. Perhaps the Damsons and the slower-growing Domesticas in general are most easily affected by the black knot; but neither is this difference of susceptibility great enough to influence the man who plants plum trees.

Black knot is, in fact, not a serious matter in the plum orchard. Plum trees which are tended, even moderately, will seldom suffer from it. Occasionally the season seems to be especially favorable to the spread of this disease and an harassing outbreak occurs; but this is seldom the case.

The knots or warts on the plum trees are caused by a fungus, although many persons suppose the cause to be an insect. This fungus grows within the tissues of the branches and twigs, but breaks through in early spring, causing the familiar warty appearance. These warts are at first yellowish; but during May or June they turn a darker greenish color and become shining and velvety. This velvety appearance is caused by an immense crop of spores which entirely cover the exposed portions of the wart. These spores are mostly soon distributed, carrying the infection to new trees and new branches. They usually lodge in the crotches of small branches, or in the axils of leaves or fruit spurs. Here they germinate and soon penetrate the woody tissue, giving rise, next year, to new warts.

Later in the fall the knots will be found to have turned a dull black. On close examination they show a fine granular surface. This is caused by the presence of another crop of spores. These late spores are thick-skinned and resistant to the weather. They live over winter and are able to originate new warts in the spring.

Besides the late spores, the fungus has another resource for carrying itself over the winter. The mycelium, that portion which grows inside the woody

tissue, does not all die when winter comes; but a part of it may retain its viability and go on growing the following spring. These facts indicate clearly enough the course of treatment which must be followed.

The first and best remedy is the pruning knife. This should be applied to every branch which shows a knot, and the application should be made at the first moment when the knot is discovered. Moreover, the knot ought to be discovered before November. That is, the plum grower should keep careful watch of his orchard throughout the summer and should cut out every knot as soon as it appears. In well-tended orchards this labor never becomes burdensome. It is good practice in cutting out knots to cut some distance below the knots, say two to six inches, depending on the size of the branch, its situation on the trunk, the virulence of the attack, etc. When knots are cut out they should be promptly burned.

Large knots which sometimes appear on the trunks of trees or on the main branches, are more difficult of treatment. Sometimes it is feasible to cut them out with a sharp knife, after which the wound is first seared by an application of pure kerosene and afterward protected by a coating of grafting wax. In case the removal of the knot is impracticable, it should be heavily painted with pure kerosene. This treatment may be best given during the growing season. If followed by spraying as directed below, this treatment will sometimes suffice to save trees after the appearance of the largest knots. Spraying, properly conducted, is an important preventive measure; and is probably worth more in the long run than the knife treatment.

It will be remembered that there are two crops of spores to be guarded against. The winter spores are usually clinging to the bark in the spring, awaiting the

first convenient occasion to germinate and penetrate the tissues. A thorough spraying with strong bordeaux mixture before the buds start will kill many or most of them,—perhaps all. Lodeman, who made a special study of this disease, recommends two early sprayings, one "during the warm days of early spring before growth starts, and again when the buds are about to burst."

The summer spores are mature during May or June; and one or two sprayings should then be given to kill them. One spraying will be enough in all ordinary cases; but in cases where it is desired to stamp out the disease after it has gained considerable headway, two sprayings can be well afforded.

It will be noticed that the two main sprayings here directed for black knot coincide exactly with the two main sprayings advised for the monilia. It is very true that the provident plum grower who gives this treatment "kills two birds with one stone" (except that in this case there are more than two, as will appear in succeeding paragraphs).

Shot-hole, or Leaf-spot.—This disease has been extensively studied from the mycological side, but seems to have received very inadequate attention by the fruit growers.*

Like most of the others, it is caused by a fungus.

---

*The principal papers relating to the shot-hole fungus are as follows:

J. C. Arthur, New York State Experiment station Report, 6:347-350. 1887.

Roland Thaxter, Connecticut Experiment station Report, 1889, page 176. Same 1890, page 102.

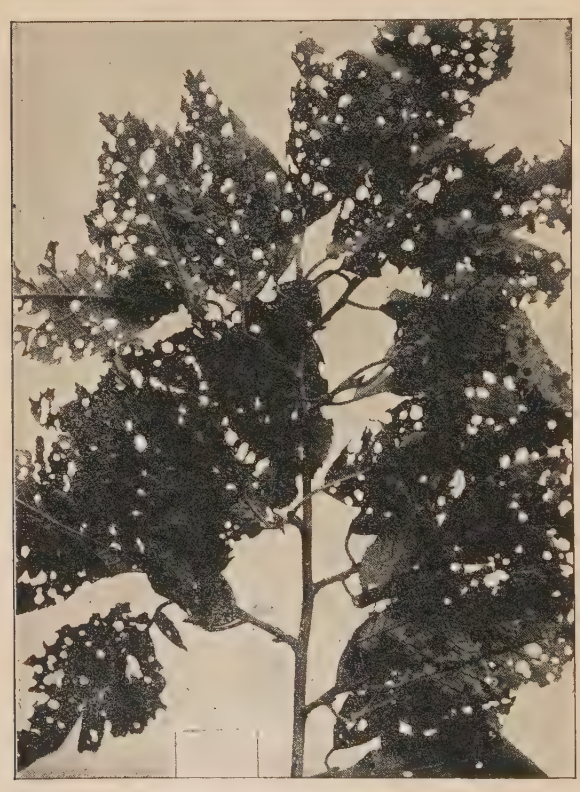
W. J. Green, Ohio Experiment station Bulletin II, 4:216. 1891.

D. G. Fairchild, United States Division of Vegetable Pathology Bulletin 6:39-40. 1894. Journal Mycology, 7:253-256. New York State Experiment station Report, 11:659. 1892. United States Division of Vegetable Pathology Bulletin 3:63. 1892.

S. A. Beach, New York State Experiment station Report, 12:688-693. 1893. New York State Experiment station Bulletin 98. New York State Experiment station Bulletin 116.

L. H. Pammel, Iowa Experiment station Bulletin 30:289-301.

The particular fungus concerned in the leaf-spot has been called *Cylindrosporium padi*. The trouble usually begins to appear in the orchard early, or at about the



SHOT-HOLE FUNGUS

time the first leaves have put out. The leaves take on an unhealthy look. They begin to show small discolored spots. These dots are yellowish toward the center and commonly have rather reddish margins. They

gradually enlarge, reaching a diameter of about an eighth of an inch. They then turn darker, the tissues wither, and the entire center usually falls out of the spot, leaving a clean, round hole, which looks as though made with shot from a shotgun. Either the discolored dots with their concentric rings, or the round shot-holes are sufficiently characteristic to enable anyone to recognize the disease at once.

Experiments have repeatedly shown the amenability of this disease to treatment with the ordinary fungicides. Beach has proved that bordeaux mixture, however, is considerably superior to any other solution in general use. As the result of his extended and thorough experiments he recommends the following course of treatment: "When but two treatments are to be made during the season, let the first be given about ten days after the blossoms fall, that is, usually about May 25 [at Geneva, N. Y.]. It should not be later than June 1. Make the second treatment about three weeks after the first. Better results may be expected from three treatments, and three treatments are especially recommended in seasons when the disease is very abundant. Make them as follows: First, about ten days after the blossoms fall; second, about three weeks after the first; third, from three to four weeks after the second."

Pockets, Bladders, or Curl.—The various troubles going under the names of plum pockets, bladders, leaf curl, etc., are mostly very closely allied. They are caused by fungi. These fungi all belong to the genus *Exoascus (Taphrina)*; but there are, according to the mycologists, several species.*

*Atkinson gives the fullest account of these fungi which has been published in this country. He does not take up the practical question of combating them, however. See Cornell Experiment station Bulletin 73. 1894.

The fruit, the leaves and the young shoots are attacked. Diseased fruits turn yellow, later grayish and finally brown or black. At the same time the fruit swells, becomes puffed up and hollow, and often rattles when shaken. These are the plum bladders.

The leaves when attacked become curled, distorted and strangely misshapen. They also assume a more or less yellowish color. The shoots are also attacked in frequent instances. They usually become swollen, puffed up, hollow, and turn a light greenish-yellow. Sometimes they are twisted, curled and greatly dis-

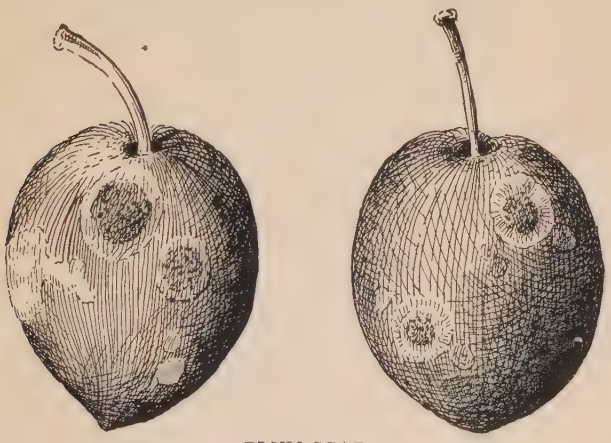
PLUM POCKETS

torted. Growth is stopped and the deformed shoot with its distorted leaves forms a characteristic and unsightly rosette.

The fungus is perennial, living over in the tissues of the plant. This circumstance adds to the difficulty of treatment. All species of plums are attacked, and probably all species of cherries. The peach is subject to the same trouble also.

In the way of treatment, nothing can be very positively recommended. It is obviously best to remove all fruits, leaves and twigs as soon as they show the disease, and burn them to prevent the maturation and distribution of the spores. This much perhaps may be insisted on. Further than this, spraying seems to promise some results. Bordeaux mixture will doubt-

less kill the spores, whenever it comes in contact with them, and will, by so much, check the spread of the disease. Lodeman tentatively recommends spraying with bordeaux mixture when the buds begin to swell and again just before the blossoms open. These two sprayings correspond with others already recommended. It seems probable also that spraying at the time when the crop of summer spores is ripe,—i. e., in May



PLUM SCAB

or June, just when the bladders turn gray,—would have a salutary effect.

Scab.—Plums are subject to the attacks of a fungus which causes a scabbing of the fruits. These scabs are usually confined to small approximately circular areas, which turn gray or brownish and seem to be encrusted with thin dried flakes of skin. I have observed it mostly upon thin-skinned varieties of the Chicasaw, Wildgoose and Wayland groups, though it seems to occur on all sorts of plums. The scab is

caused by a fungus, known to science as *Cladosporium carpophilum.*

No definite experiments seem to have been made in the control of this scab except by Chester, who worked upon peaches.* He reports that early and repeated sprayings with bordeaux mixture are effective. Craig has also reported success in the use of bordeaux mixture. It seems probable that the general prophylactic treatment with bordeaux mixture recommended repeatedly in this chapter will overcome this disease in common with nearly all the others of fungous origin which attack the plum.

Leaf rust.—The leaf rust of the plum appears to have received little notice from horticulturists, and the mycologists have paid small attention to it except to place it in their lists. Hedrick thought it to be of economic importance in Oregon,† and Pierce made experiments in its treatment on the Pacific coast. The present writer has observed it in great abundance on several species of wild plums and on some cultivated varieties in Oklahoma. In that country it seems to be especially virulent, and, apparently, may easily come to be of practical consequence. The rust appears on the leaves, usually on the under sides, late in the summer.

Fairchild‡ recommends bordeaux mixture for this disease. Pierce§ secured good results from the use of an ammoniacal copper carbonate solution; but it is probable that the bordeaux mixture would have done at least as well. It seems fair to expect that the careful use of bordeaux mixture during the early part of

*F. D. Chester, Delaware Experiment station Report (1896), pages 60-63.

†U. P. Hedrick, Oregon Experiment station Bulletin 45:67. 1897.

‡D. G. Fairchild, Bordeaux Mixture as a Fungicide, United States Department of Agriculture, Division Vegetable Pathology, Bulletin 6.

§N. B. Pierce, Journal of Mycology, 7:354-363. 1894. This is the fullest account of the plum rust extant.

the growing season would reduce the plum-leaf rust to a minimum.

Flyspeck fungus.—I have several times observed, especially on plums sent me from the southern states, small areas thickly dotted with small black spots, looking very much like small flyspecks. I have seen these on nearly all the common species of plums, including *Prunus americana*, *Prunus maritima*, and the Wayland, Wildgoose and Miner groups. Occasionally the black, specky appearance becomes so conspicuous as to attract the eye and to detract from the appearance of the fruit. It might possibly make a lot unsalable, though I have never known it to become so severe.

Specimens were examined by my colleague, Professor L. R. Jones, who pronounces them of fungus origin. The little dots are made up of masses of branching dark-colored hyphae. This fungus is regarded by Professor Jones as being probably identical with the one which causes the flyspeck on the apple.

If this trouble should ever become of economic importance, it would be worth while to try treating it with bordeaux mixture.

Phoma.—What seems to be an entirely different fruit-spot is mentioned and illustrated by Bailey, who gives the following account of it:* "A fruit-spot has been sent to me by T. V. Munson, Denison, Texas, on the Golden Beauty. The disease is said to be serious in some years. It does not injure the fruit greatly except to disfigure it and to render it unmarketable. I submitted the specimens to Professor J. E. Humphrey of the Massachusetts agricultural college, who found the disease to be a phoma, but the exact species could not be determined. It is, no doubt, somewhat allied to the black rot of the grape, and the treatment used

*L. H. Bailey, Cornell Experiment station Bulletin 38:56. 1892.

SUNSCALD OF PLUM TREE

for grapes should be tried upon the plum." This disease has not been observed by the present writer.

Powdery mildew.—This disease is found on apples, pears, cherries, plums and several other fruits.

It is seldom destructive on plums, however. Not a single serious case of its work has come to the knowledge of the writer. The powdery mildew can be easily controlled by spraying with fungicides.

Lichens sometimes appear on plum trees in quantity, especially in the southern states. They are unsightly, but whether they do any direct damage or not is an open question. Bordeaux mixture will keep trees free from lichens.

Sunscald.—Plum trees are subject to sunscald, to just the same extent that other fruit trees are, and no more. Sunscald is a very serious matter in some parts of the country, especially in the southwestern states. The danger from sunburning is well understood by orchardists in that country, and well-studied precautions are taken to avoid damage. In some other sections of the country the seriousness of sunscalding is not fully appreciated; and many trees are lost which might have been saved by a little foresight. The scald is especially disastrous when, as sometimes happens, it is followed by borers. In fact, the scalding of a tree leaves the way open for the attack of all sorts of parasites.

Sunscald is worse on dry, sandy land, and on southwestern exposures. It is most prevalent in the southern and southwestern states, where, in some places, it may fairly be counted the orchardists' worst enemy.

The precautions to be exercised against sunscald are good cultivation and low heading of the trees. The latter is the more obviously important, and is always properly recommended. Good cultivation is more important as a protection from sunscald than is usually supposed. The scalding does not come chiefly from the direct action of the sun, but rather more from the

heat reflected from the soil. Everyone knows that the reflection is much less from newly-turned, well-pulverized, loose-lying soil, than from hard, smooth, compacted earth. Moreover, good cultivation keeps up a thrifty growth in the trees, and enables them to resist the effects of the sun much better. It may be noted in any orchard that the unthrifty, half-dead trees show the first and worst cases of sunscald.

After a tree is once sunscalded there is always considerable difficulty in remedying the damage. In extreme cases the shortest, simplest and best procedure is to cut the tree down and replace it with a new one. Trees badly scalded should not be sacrificed, however, until it appears clearly that their usefulness is at an end. Scalded trees often continue to bear good crops for several years, and, at worst, the scald is not contagious. Trees which are only slightly damaged can usually be reclaimed. The best method is as follows: Clean away first all scaly, dead bark, and remove all lichens and insects. Then apply grafting wax or some suitable protective and antiseptic material. Lastly, give whatever protection may be necessary from further sun damage. This may consist in placing a board shield in place, tying on papers, or in the adoption of such other expedient as may seem most feasible to the practical orchardist.

Gummosis.—Every man who grows stone fruits, peaches, cherries or plums, has often marked with interest, usually with doubt, and sometimes with sorrow, the accumulations of gum on the trunks and branches. This gum at first appears whitish and clear, almost transparent. After a time it becomes discolored, darker. It may accumulate in large quantities at certain points, as at a crotch partly split by the wind. Usually it is in comparatively small patches and nodules here and there through the tree. It is most

conspicuous on the tree trunks; but may be found on the small twigs and fruit spurs, and even on the fruit.

Many fruit growers have the notion that this gumming is caused by some insect. Some attribute it directly to the borer. Others suspect fungi or bacteria of being the cause of the trouble. According to the best information now at hand, all these suppositions are partly right and partly wrong.

It seems that the cell walls in the several tissues of the stone fruits are peculiarly apt to break down or disintegrate. Just what may be the chemical nature of this change need not now concern us. But at any rate the substance of these cell walls becomes semi-fluid and exudes as the white gum first noticed by the orchardist. This soon absorbs water, swells, and finally becomes discolored after exposure to the air, rains, etc.

This disintegration of the cell walls is incited by any sort of mechanical or physiological injury to the tissues. Splitting of the branches from wind, or overbearing, abrasions from single-tree or hames, bruises from hailstones, the excavations of borers, freezing of the trees, are common mechanical causes. The commonest fungous origin of gummosis is in the attacks of the fruit rot or monilia. This disease seems to injure the tissues in such a way as to be especially favorable to the formation of gum. Improper methods of cultivation have also been assigned, with some show of reason, as a cause in certain cases. Some writers on the subject charge the trouble in more general terms to weakened vitality. This phrase does not mean much; and it is doubtful if it has much basis in fact, aside from the various more nearly ultimate causes mentioned above. Beach concludes* that "the exces-

*S. A. Beach, Gumming of Stone Fruits, American Gardening, 19:606, August 27, 1898. This is the most important recent contribution to the subject in America.

sive production of gum which is popularly looked upon as a disease and called gumming, is not a specific disease, for it is characteristic of many troubles of stone fruits and other plants."

CANKER OF BRANCHES OF SATSUMA

On plums and also on peaches this gummosis, following monilia, leads to a sort of canker. The exudation of gum, especially at some point where the fungus has severely attacked a fruit spur or small leaf spray, results finally in an open wound. This does

not heal for a long time. Often it never does. The diseased portion seems rather to increase in area. The margins are raised, blackened, with a hard, scaly surface. In the middle of such a wound will often be found the dead stub of the branch from which the trouble started. A better idea of the appearance of this canker may be gained from the accompanying illustration, p. 334. This trouble, which is occasionally serious with peaches, does not seem to be so common with plums. The worst cases that I have observed were on Satsuma trees.

The Japanese varieties are undoubtedly the most susceptible. The Americana species all have harder, tougher, closer-grained wood, less subject to mechanical injury and less subject to gummosis. Still, I have observed incipient cases of the canker here described on trees of Whitaker, Strawberry and a few other native sorts. In some instances the branches are so much weakened by this canker that they break off readily in the wind or under moderate loads of fruit. This completes the chain of troubles;—monilia, gummosis, canker, breakdown.

Gummosis is apparently always a secondary matter. The way to treat it, then, is to get at the primary cause. If due to borers, apply the remedy for borers. If due to overbearing, thin the fruit. If due to bruises from the single-tree, discharge the hired man. If due to monilia, spray. The last is perhaps the most important cause and the most practical remedy.

Curl-leaf, or Sunburn.—These have been described as separate troubles; but they appear to be closely related, if not identical. The curl-leaf has been described by Hedrick,* who found it characteristic of the Italian Prune in Oregon and other parts of the

*U. P. Hedrick, Oregon Experiment station Bulletin 45:72. 1897.

Pacific coast region. The sunburn is described by Toumey as occurring in Arizona. Speaking of what he calls curl-leaf, Hedrick says: "Beginning in midsummer, the leaves begin to curl conduplicately without withering, but shriveling somewhat. As the season advances the leaves become a yellowish brown and many of them drop. It affects practically all the Italian Prune trees, there being but rarely a tree that escapes. As far as I can learn, all other varieties are exempt. In some orchards the trees are almost wholly stripped of their foliage."

Although definite experiments in the treatment of this disease, or these diseases, do not seem to have been made, the practical treatment of them is very strongly hinted at in the foregoing paragraphs. Treatment must be preventive rather than remedial. Measures likely to prevent the appearance of sunburn or curl-leaf are proper cultivation, keeping the soil in good mechanical texture, aeration of the soil, proper drainage, proper irrigation, and the preservation of vigorous, healthy foliage by timely spraying.

Single-tree disease.—This malady I have observed in nearly every orchard I ever visited. With unimportant exceptions it is always caused by the hired man. It seems to be quite impossible to prevent his ravages. There are times when it seems to be his chief aim in life to drive the plow or cultivator in such a manner as to insure the effective skinning of the trees by the single-tree.

There seems to be no satisfactory preventive of this trouble, unless the owner is able to plow and cultivate his own orchard with a well-trained team. Short single-trees, with leather sheaths at the ends of the tugs, will reduce the damage to some extent. Harnesses which do away with hames and single-tree are highly recommended, and are doubtless very useful.

SINGLE-TREE DISEASE

Under this head may be grouped several quite similar mechanical injuries. Sometimes they are caused by the hames; sometimes by the hub of the manure cart; sometimes by the ladder of a careless picker.

Such wounds are to be smoothed with a sharp pruning knife and, where practicable, should be dressed with a good coating of grafting wax. In cases of extreme damage, and when the tree is especially valuable, an attempt may be made to graft new pieces of bark over the wound. This can best be done in late summer, at budding time, when the bark peels easily; but, though more difficult of performance in the spring, the work has a fair chance of success if carefully performed then. Full directions for doing this work are given in the paragraph on mice in the next chapter.

XXXIV

Insects and Other Enemies

THE CURCULIO.—This is by far the worst insect enemy of the plum. The curculio (*Conotrachelus nenuphar*) is a small insect of the snout-beetle family. It is a little less than a quarter of an inch long, rough and grayish or almost black. The female begins to lay her eggs in the young fruit as soon as it is formed and continues at her nefarious business for ten days to a month, depending on circumstances, chiefly the weather. She punctures the skin of the plum with her snout, and in the puncture she lays her egg. In front of the puncture she cuts a small crescent-shaped gash, which is supposed to prevent the crushing of the tender egg by the swelling of the growing fruit. The egg hatches in from three days to a week, and the small

white larva or grub begins to feed inside the plum. Usually it penetrates to the stone, where it feeds upon the surrounding flesh; or it may even gnaw into the young, soft pit.

The work of the beetle may be first detected by the crescent-shaped marks in the skin of the fruit; but as soon as the larva begins to feed, small drops of whitish gum can be seen exuding at the point of puncture. Fruits attacked by the curculio usually drop sooner or later. This dropping from the curculio's work continues throughout the season, as one plum and another

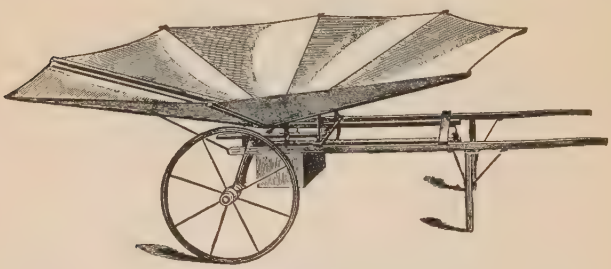
THE PLUM CURCULIO, Magnified

succumb to their injuries. A few plums may hang on till picked, though two or three larvae may be at work in them. The principal season of "plum drop" from curculio damage, however, occurs when the fruit is about half grown.

The curculio seems to prefer thin-skinned plums; but it is more partial to some varieties than others without regard to the thickness of their skins. Many nurserymen of more or less conscience have offered, from time to time, many "curculio-proof" varieties of plums. Nevertheless, it is well known to-day that no

such thing exists in fact. At the present day plum growers rely chiefly on other preventive or remedial measures and pay little attention to the selection of the "curculio-proof" varieties.

Spraying may prevent damage by the curculio to a considerable extent. The beetles eat the leaves and buds and fruit, and hence it is thought that they can be poisoned. The trees should be sprayed with paris green, about one pound to 100 gallons of water, just before flowering. Another spraying should be given a week after the blossoms fall. If bordeaux mixture is used for the fruit-rot, leaf-spot, or other diseases,



JOHNSON'S CURCULIO CATCHER

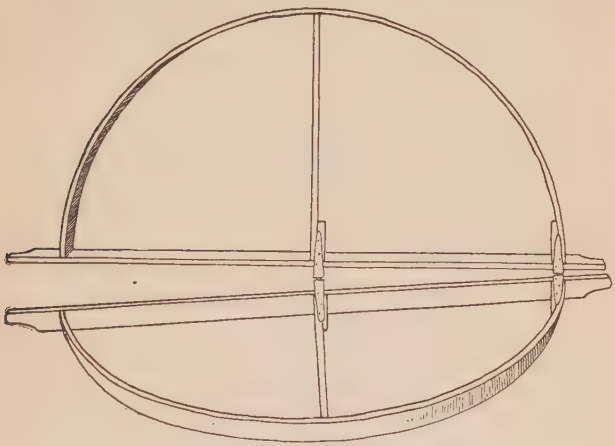
the paris green may be added to it and applied at the same spraying.

One of the best preventive measures is that of jarring the trees and catching the beetles as they fall. This is sometimes done in an inverted umbrella, or upon a sheet spread on the ground; but many better arrangements have been devised. Several curculio catchers are manufactured and held for sale, more or less covered by patents. The general type of such machines is shown in the accompanying figure of Johnson curculio catcher.

The principal feature of all these machines is the

large canvas spread, which catches the dropping insects when the trees are jarred. There is a slit in the front side of the canvas funnel, which permits the entrance of the tree trunk. This brings the trunk approximately into the middle of the funnel and spreads the sheet so as to catch the curculios from all the branches.

If the ground under plum trees is smooth and hard, the beetles may sometimes be shaken directly



FRAME FOR CURCULIO CATCHER
Recommended by Goff

onto the earth and swept up. Sometimes the ground is paved with stones for this purpose. There used to be a notion extant (vide earlier editions of Downing) that plums were free from curculio on heavy clay soil. This is not so; but it probably had its origin in the comparative ease with which the beetles are destroyed on hard ground.

Where a few plum trees are grown near the farm buildings, it is sometimes practicable to place them

in the chicken yard. The chickens usually keep the ground bare underneath the trees and also eat a considerable number of the beetles and larvae which fall to the ground. This is not an ideal way to grow plum trees, however.

The Plum-tree Aphis.—This aphis is sometimes very troublesome. It attacks the young shoots, especially the under sides of the tender leaves, and sucks out the juices until the leaves curl, the shoots wither, and growth may be practically stopped. In extreme cases young trees are even killed.

It is difficult to control. Paris green and similar poisons will not harm it, for the simple reason that they are applied to the *outside* of the leaf, while the aphis sucks its liquid food from the *inside*. Something must be applied to the insect itself which kills it by contact, or smothers it by covering or clogging its breathing holes, or which effectually disturbs or dislodges it.

Tobacco water is one of the best of these contact insecticides. Tobacco stems can be bought of all seedsmen and dealers in horticultural supplies at reasonable prices, usually about $1.50 a hundred pounds or $20 a ton. These should be steeped in boiling water to make a strong decoction, which should be vigorously applied to the insects with a sprayer. More than one application will usually be necessary; but, if persevered in, this treatment will prove efficacious.

Kerosene emulsion is very generally used, and has many points of advantage. It is applied with the usual spraying machines, unless one has at hand some of the specially constructed sprayers for mixing kerosene with water. If the ordinary kerosene emulsion is to be used, it may be made up according to the following directions: Take one pound of hard soap (preferably whale-oil soap), two gallons of boiling water, and

four gallons of kerosene. Churn these well together by pouring or pumping for fifteen or twenty minutes. When ready to use, add sixty to one hundred gallons of water. This recipe can be halved or quartered, if smaller quantities of the emulsion are needed. There are several other formulas for making the emulsion, but all give about the same results. Two or three applications of the kerosene emulsion will probably be required to clear out the aphis. Care must be taken not to make it too strong, for sometimes it damages the young shoots more than do the insects.

The Plum Lecanium scale.—This plum scale (*Lecanium prunastri*) occasionally gives trouble. Slinger-

THE PLUM LECANIUM SCALE

land relates that in 1894 in one orchard of over 2000 trees in New York, "one-fourth of the immense crop was not worth picking and most of the remainder was badly damaged." These scales may readily be seen at any time on the twigs and branches. Their general appearance is plainly indicated in the cut. This pest can be combated to best advantage during the winter, when it should be sprayed two or three times with strong kerosene emulsion.

The San Jose scale (Aspidotus perniciosus).—This scale insect attacks plum trees, in common with nearly all other fruits. So much has been said and sung about this special pest of late, however, that no general ac-

count of it need be given here. It may be said briefly that the San Jose scale is amenable to proper treatment, and not more difficult of extermination than many other insect pests. Kerosene emulsion, whale-oil soap, kerosene and water, crude petroleum, or pure kerosene will kill it if thoroughly applied.

Borers sometimes attack plum trees, but not so frequently as apples and pears. The peach-tree borer, which is quite a different insect from the species working on apples, also attacks plums.* The damage from borers is sometimes serious; but seldom so except in neglected orchards, where all sorts of pests always multiply.

The remedies and preventives for borers in plum trees are the same as those generally employed in fighting borers in the apple orchard. The first preventive measure is clean culture. Weeds and grass standing about the trees invite the moths to come thither and lay their eggs. Secondly, the trunks should be kept clean of dead and scaly bark. Patches of sunscald or canker are especially attractive to the borer. Thirdly, various washes are advised to keep the trunks clean and to prevent the young borers from getting into the trees. These are usually of lye or strong soap. The action is the same for all. The potash, or other alkali, keeps the trunk free from certain parasitic growths. If strong and carefully applied, it is very effective. The solution used and recommended by the writer is made by dissolving a pound of concentrated lye or potash in a large pail of water (three to five gallons). This solution is very strong and must be handled with caution. It may be put onto the trees with a large paint brush, an old broom trimmed down, or a convenient bunch of rags tacked to the end of a

*See especially M. V. Slingerland, Cornell Experiment station Bulletin 176. 1899.

two-foot stick. It should be applied carefully so as not to waste the solution, and at the same time to reach all parts of the trunk and larger branches. Old and neglected trees should be scraped before using any wash, and then a proportionately large dose should be given. Such washes should be used early in spring and at intervals of two months thereafter till three applications have been given.

Lime washes are beneficial to a certain extent. They tend to protect the tree somewhat from sunburn, as explained elsewhere. The potash solutions are much better, however.

After borers have hatched and begun work in the trees, no known solution will clean them out. The only resource of the orchardist then is to dig them out. This can be done with a pliable wire and a sharp knife. The work is best done in early summer, when the chips cast out by the borers, or the exuding gum, will reveal the location of the little workers. It is easier to keep borers out than to dig them out; and it is better for the trees.

The Apple Tent Caterpillar.—This pest, which has been excessively troublesome in some parts of the country within the last two or three years, occasionally works on plum trees. In fact, its favorite feeding ground seems to be in the wild cherry and plum trees along the roadside; though in the orchard it appears to prefer the apple trees.

Considerable headway can be made against the tent caterpillar by collecting and burning the egg-masses in winter and early spring. The most feasible campaign, however, begins with the egg picking and is followed by thorough sprayings with paris green. The first spraying should be made just as soon as the leaves open. Another should be given in ten days, and still another ten days or two weeks later, if the

caterpillars are abundant. Early and thorough spraying will give practical immunity from this serious pest.

Cankerworms.—These small caterpillars, or measuring-worms, about an inch long, hatch in the spring from eggs laid in the fall (fall cankerworm) or spring (spring cankerworm). They appear on the trees with the opening leaves and are easily discovered by jarring a branch, when they come down out of the trees suspended by fine silken cords of their own spinning. Bands on the tree trunks, over which the wingless female moth cannot crawl to lay her eggs, are often recommended as a good means of defense against cankerworms. Such bands should be of sticky tar, cotton or similar material. But really the best treatment is thorough spraying with paris green or some similar arsenical poison. This should be applied when the little caterpillars make their first appearance. One spraying is usually enough, unless imperfectly done or unless heavy rains wash off the poison.

Bud Moth.—The bud moth *(Turetocera ocellana)*, better known as an enemy of the apple, sometimes attacks plum trees, especially young trees in the nursery. The larvae eat into the young buds at the time they are opening, usually destroying the young shoot. They also eat the very young leaves. When they are discovered soon enough they may be killed by spraying with paris green. The spray really ought to be given just as the buds begin to open; but, unless one suspects an attack in advance, it is seldom possible to be so prompt. If the larvae are discovered at work, however, a spraying should be given at once.

Red Spider.—This common pest of greenhouses and conservatories rarely attacks plum trees. The mite or spider itself is so minute that it can hardly be seen, and one becomes aware of its presence first by

the discoloration and generally withered and unhealthy look of the foliage. The treatment directed against this insect in greenhouses is to spray it with a heavy stream of water from the hose, thus dislodging it from the plants. Doubtless the same method of treatment would prove practicable if the spider became very troublesome on plum trees. It is not likely ever to be an orchard pest of much consequence, however.

Bumble Flower-beetle.—Goff reports this insect (*Euphoria inda*) as sometimes damaging plums in Wisconsin. It is a large, yellowish-brown beetle with the wing-covers sprinkled with irregular black spots. Although the common name calls it a flower-beetle, the damage which it does consists in piercing the skin of fruits when nearly ripe and eating the flesh. It is said to have been very injurious at Madison, Wisconsin, in the summer of 1896. No remedy is suggested except to destroy the beetles when they can be caught. Possibly they can be jarred into curculio catchers.

Other Insects.—There are several other species of insects which sometimes cause slight trouble to the plum-grower; but they are of minor importance. In case of serious trouble from any unusual pest, an entomologist may be consulted without great difficulty. Send samples of the insect and its work to your state entomologist, your experiment station, or your agricultural paper. Expert advice is so readily available these days that no one ought to suffer seriously without knowing what is the matter.

Mice are tucked in here with the insect enemies of the plum because there is no other convenient place to speak of them. They sometimes do great damage in the nursery by eating young budding stock, or by digging and eating plum seeds which are sown in the fall for growing stocks. Their customary wickedness,

however, is in eating the bark off the trunks of young trees during the winter. This work is done both in the nursery and in the orchard.

There seems to be no practicable way of preventing the mice from eating fall-planted pits. Where field mice are thick, they merely have to be counted on as one of the risks. When they are expected to be troublesome, the best way is not to sow the seeds in the fall. Almost equally good results can be secured by stratifying the seeds and sowing in the spring. This requires some more work, however.

Young trees are sometimes protected from the attacks of mice and rabbits by tying cornstalks, newspapers, wire netting, strips of wood, or some similar material about the trunks. Banking up the trees in fall with soil or heavy manure will often prove a sufficient protection. Treading down the snow is sometimes advised; but it has to be attended to after every heavy snowfall, and does not work out well in practice. Trees surrounded by dead weeds and loose rubbish are especially liable to attacks from mice; and such litter should therefore not be allowed to accumulate anywhere near the trees.

XXXV

Cooking Plums

PLUMS have a wider range of culinary usefulness than most fruits. If the reader is not already acquainted with this fact, he will get an inkling of it by reading over the following well-tested recipes, and he will become fully convinced of it by two or three years' experimenting on his own account. One reason why plums have not grown more rapidly into the popularity they deserve is that so few housewives know how to make the most of them. This is particularly true of the native plums; and Professor Goff did a good thing when he issued a bulletin of directions for cooking and using the American varieties.

Stewing.—The ordinary way to cook plums for serving immediately is to stew them. Use ripe fruit

and stew in just water enough to keep them from burning, until nearly soft, then add sugar to suit the taste. Some of the Americana plums which have very astringent skins may be improved, it is said, by cooking a few minutes in water with a pinch of soda,—about half a teaspoonful to the quart of water,—and pouring this water off before the main cooking begins.

Compote.—Plums may be served for dessert in a compote, made according to the following recipe from Mary Foster Snider: Make a syrup with two pounds loaf sugar, one quart of water. After it boils, add the white of an egg whipped up in a little water, whisk it into the syrup and simmer very gently, skim off all scum as it arises. Then put one quart fine ripe plums into the syrup and simmer very gently until tender, but not soft enough to break. Take them up and boil the syrup ten minutes longer; pour it over the plums and serve.

Canning.—Plums are especially suitable for canning. Hardly any fruit grown keeps so well in cans and comes out with such appetizing freshness in the winter. Green Gages enjoy a special reputation for canning; though in this case one should consider all the varieties of the Green Gage type (Bavay, Hand, Lawrence, etc.) as equally entitled to consideration. The native plums are extensively canned in those localities where they are commonly cultivated. The Japanese varieties are mostly good canned; some better than others. Satsuma is a favorite with some. The canneries use mostly "Green Gages" (which are probably oftenest Bavays) and "Egg plums" (which are sometimes Golden Drops).

To can plums at home, select the best fruit possible, prick each plum with a fork to prevent the bursting of the skin, and pack tightly into glass jars. Make

a syrup, using equal measures of sugar and water, or less sugar if the plums are very sweet. When the syrup boils, fill the cans with it to overflowing. Lay on the covers and set the cans on straw or wood in a kettle or boiler of boiling water. Let them boil for one-half an hour; remove the cans, and screw down the covers tightly. If the juice should have boiled over and the cans are not quite full, one need not refill them with syrup, for when the covers are screwed on while the fruit is still hot, the plums keep perfectly whether the cans are full or not.

Some cooks say that plums cooked in the syrup are apt to be tough. If any difficulty of this sort is experienced, the following directions may be followed: Steam or cook the fruit in a porcelain-lined kettle until tender, put in cans that have first been treated with boiling water, and cover with boiling syrup made of equal parts of granulated sugar and water, filling the can to the top; then run a silver knife around the can inside to let out the air, and seal at once.

Canned plums may be used for pies and for mixing with or flavoring other fruits. Plums are often canned without sugar to be used in the winter for making fresh plum butter. The juice of canned plums makes excellent jelly.

Preserves.—Plum preserves are hard to beat. Plums with solid flesh which does not cook to pieces make the best preserves. Large, freestone varieties like Italian Prune, Goliath or Sharp, are especially desirable. When the natives are used, those varieties like Wildgoose, Fanning and Milton, which peel easily, should be chosen.

Weigh the plums, and to each pound of fruit allow a pound of sugar. Peel the fruit, scalding first for a few moments in boiling water if necessary. Throw them into a large earthen jar, putting in first a layer of

fruit and then a layer of sugar. Let this stand over night. In the morning strain off the juice and bring it to the boiling point. Then put in the plums, cook very slowly until tender. Skim out the plums carefully with a spoon and lay them in jelly tumblers or small jars. Boil the syrup till thick, and pour over the fruit. Seal the tumblers or jars, tie them up with brandied paper, or put a lump of paraffin as big as a hickory nut on top. The paraffin will melt, if put on while the fruit is hot, and will seal the jar nicely.

If plums are used which are not easily peeled, put them into the large stone jars with sugar sprinkled between the layers as before. The jars should be put into a kettle of cold water, brought to the boiling point, and cooked very slowly until the plums are tender. Do not allow them to boil to pieces. Take out the plums carefully and put into the jars as directed above; boil down the juice, pour over the fruit, and seal. Damsons are sometimes preserved in this way; but Damsons are not the best of plums for preserving, though they are habitually used for this purpose in some families.

Spiced plums.—Make a syrup, allowing four pounds of sugar and one pint of vinegar to each seven pounds of plums; to this add a teaspoonful of allspice, one of cloves, two of cinnamon and half-ounce of ginger root, tying these spices into muslin, cooking them in the syrup; when it boils, add the plums, bringing all to the boiling point, then simmer slowly for fifteen minutes, and stand in a cool place over night. Next drain the syrup from the plums, put the plums into stone or glass jars, and boil the syrup till quite thick, then pour it over the fruit and set away. Some cooks think it unnecessary to drain off the syrup before boiling down the last time. Others think, on the other

hand, that this process should be gone through not only once, but nine times!

Many of the native plums are fine for spicing, especially the comparatively hard-fleshed varieties of the Wayland group. Damsons are largely used for this purpose in some neighborhoods. They are good, but inferior to the native varieties mentioned.

Pickled plums.—Almost any kind of plums may be pickled, using the following recipe, given by Mary Foster Snider: Boil slowly with a pint of water until very soft. Press through a colander, weigh the pulp and to every five pounds allow three pounds white sugar, one-half pint vinegar, a level tablespoon each of ground cinnamon and cloves, and a level teaspoon salt. Boil and stir until rich and thick. Seal boiling hot in pint self-sealing jars.

Jelly.—In the humble opinion of the writer, plums make the best jelly in the world. If made from the proper varieties, plum jelly has fully as good a color as the finest currant jelly, a better consistency, and a richer, more fruity flavor. Wayland is the best variety yet discovered for jelly, though all the native red varieties are fine; and almost any plum will do. The fruit should be picked rather green.

To every peck of plums add a quart of water. Cook in a porcelain kettle until the plums are very soft and the juice rich and syrupy. Pour them into a strong muslin bag, hang it upon a stout hook, and leave to drain over night. Do not squeeze the pulp or the jelly will be cloudy. In the morning measure the juice, and to every cup of juice allow one cup of sugar. Or somewhat less sugar may be used, especially if the jelly is to be eaten with meats,—a purpose for which plum jelly is peculiarly desirable. Bring the juice quickly to the boiling point, and boil rapidly for

twenty minutes, skimming frequently. In the meantime put the sugar in an earthen or granite dish and set it in the oven to heat. Stir it often, and leave the oven door ajar, if there is the least danger of browning it. As soon as the juice has boiled long enough, draw the kettle to the back of the stove, add the heated sugar, stir until it is all dissolved, return to the fire, and boil one minute from the time it begins to boil. The jelly glasses should be in readiness, standing in hot water. Pour the boiling liquid into the jelly glasses, and seal by dropping a bit of paraffin on top of each glass of jelly. The hot liquid will melt the paraffin, which will float and cover the jelly, making a perfect seal when it cools. Other schemes of sealing are in practice with different housewives; and one will do as well as another if it keeps the jelly from spoiling.

Plum Juice is excellent for use in puddings and pudding sauces. Both the flavor and the color are attractive. For this purpose the juice from canned plums may be used with much satisfaction; and plums which are not fit to can for the fruit itself may still be worth canning for the sake of the juice. In such cases less sugar may be used. The juice alone may be put up in cans or bottles. Cook the fruit and drain it as for jelly. Boil the juice fifteen to twenty minutes, put in the cans or bottles, filling them entirely full, and seal air-tight. The juice may be slightly sweetened if desired, but too much sugar will cause it to jelly.

It may be mixed into almost any sort of pudding sauce, and is especially desirable in making tapioca puddings. Soak the tapioca over night in equal parts of plum juice and water before making the pudding. In the morning cook the tapioca in a double boiler till clear, then add sugar to suit and pour into molds, allowing it to get very cold before serving. In serving

this dish, rich yellow cream looks particularly well in contrast with the red plum color.

The juice may also be used in cornstarch puddings, and in all kinds of gelatine desserts.

Marmalade, Jam, or Plum butter.—Boil the fruit in clear water until nearly done; remove from the stove and put through a colander to remove the pits; then rub through a sieve to make pulp fine; place pulp in kettle with about half as much sugar as pulp,—or if you wish to have it very rich, nearly as much sugar as pulp,—and boil down to the desired thickness, stirring almost constantly to prevent sticking to the kettle.

Another recipe given in a bulletin by Professor Goff is designed to make very nice plum butter out of De Soto, Wyant and other freestone plums. Pare and take out pits, put in granite kettle or pan and sprinkle heavily with sugar, and let stand over night. In the morning there will be juice enough to cook them. Stir constantly while cooking and add more sugar if not sweet enough. This method preserves the grain of the fruit, and with plums like De Soto, makes a butter equal or superior to peach butter. If put in glass and canned, less cooking is required than if kept in open jars.

Drying.—The prunes of commerce are dried plums. In some cases drying plums may be practicable for the small household. In those states where the Americana plums are largely grown, the freestone varieties are selected, pared, pitted, spread on plates, lightly sprinkled with sugar, and dried, first in the oven, and later in the sun. They are then cooked like dried peaches when wanted.

Uncooked.—Plums of certain varieties are unsurpassed served in their natural state at dessert. Besides this, almost any sweet variety may be served raw with

sugar. Large, freestone, solid-meated varieties, which peel easily, are best, flavor not being considered. Take such a variety as Burbank's Climax, which may be quickly peeled, and split in yellow halves the size of a Waterbury watch; cover this with sugar and rich cream, and you have a dish to make the proverbial "peaches and cream" hide itself for shame! Some of the Americana varieties, being exceedingly rich, high-flavored and aromatic, are especially fine served in this way. Even clingstone varieties may be eaten with sugar and cream by slicing the flesh off the stones just as it is often done with clingstone peaches.

"Peaches and cream" is a name which is used to make men's mouths grow moist; but most folks have not thought of plums with sugar and cream. It is a combination worth trying.

XXXVI

Plum Trees as Ornamental Plants

THE ornamental value of plum trees is rather remarkable. Almost every species is beautiful in blossom, and many of them are attractive in foliage and in habit of growth. This fact has received some recognition from landscape gardeners and plant lovers, but the knowledge of the good points of plums and cherries from the decorative standpoint has not been sufficiently spread. The following quotations from Professor Sargent's Sylva show something of a discriminating tree lover's appreciation of the plums and cherries.

"As an ornamental plant," says Professor Sargent, "*Prunus americana* has real value; the long wand-like branches form a graceful head, which is handsome in

winter, and in the spring is covered with masses of pure white flowers, followed by ample bright foliage and abundant showy fruit."

"As an ornamental shrub or small tree, *Prunus alleghanensis* deserves a place in the garden for its abundant flowers and handsome fruit."

The Bird cherry, *Prunus pennsylvanica*, is said to be "a handsome, shapely, though short-lived tree, which in early spring is conspicuous for the great quantity of flowers which cover its branches."

The choke-cherry is said to be "a handsome plant," and the black cherry, *Prunus serotina*, is spoken of as "one of the stateliest and most beautiful trees of the eastern woods."

"The beauty of the foliage of the mock orange, *Prunus caroliniana*, its early and abundant flowers and the rapidity of its growth, make it a favorite garden plant in the southern states, where it has been used from early times to decorate the neighborhood of dwellings and to form hedges, for which purpose it is well adapted by its rigid leaves and by its power of withstanding the effects of annual prunings."

Of the Islay, *Prunus ilicifolia*, which may also be called a sort of plum, Professor Sargent says: "Few of the broad-leaved evergreens of North America are more beautiful or better suited to adorn a garden."

Such opinions might be multiplied from other sources, showing how the best critics regard the plum and cherry trees as beautiful and interesting objects in the garden. We have all heard how the Japanese people love the plum and the cherry blossoms, how they plant these trees in their gardens and grow them in pots, and how they celebrate every year a cherry-blossom festival. The plum and cherry blossoms of the orient seem to make much the same impression on the visiting foreigner, for we have learned that when

another artist returns from Japan we are always to be treated to a new lot of plum blossom and iris pictures.

Anyone who has been in a large plum orchard at blossoming time, especially where the trees were of Japanese or American species, must have been struck with their great beauty. A single tree is often ornamental, but a mass of trees in blossom have a different and perhaps a more strikingly beautiful effect.

As a class, the varieties of the Wayland group of native plums are probably the most attractive of any grown in this country. They are graceful in habit, with good foliage, and the blossoms are peculiarly abundant, graceful, and clean in their snowy whiteness. Reed has the best formed tree, but Moreman and Wayland have the better flower clusters.

Next to these probably stand the members of the Wildgoose and Chicasaw groups. They are graceful in general habit, with fresh, smooth twigs and clean, shining foliage. The blossoms are borne in great profusion, in showy graceful clusters.

The Americana and Miner varieties have a different habit of growth, and a different effect of foliage, but a no less decorative air. Nor are their blossoms less ornamental. In the Nigra group a conspicuous tinge of pink shows through the larger, showier blossoms, and we have, in the case of special varieties, really the most handsome flower effect to be seen among plums in America. Cheney may be mentioned as of special merit for its good habit of growth combined with its extra large and showy blossoms. Mr. J. W. Kerr has in his collection a striking full-double variety of *Prunus americana*, which has not yet been introduced to the trade, but which is a plant of real merit. It blossoms profusely with large clusters of flowers, the character of which is only weakly suggested by the accompanying engraving.

DOUBLE BLOSSOMS OF AMERICANA PLUM
Of J. W. Kerr

The Domestica plums are not usually very ornamental, as compared with the American species, but occasionally one finds a cluster of blossoms which will make a fine bouquet for almost any critic. The blossoms are much more sparsely produced on the stems, but they are larger and individually more effective.

The Japanese plums are profuse bloomers, and make a very fine effect in the orchard rows at flowering time. The foliage is usually good, too. Yet for purely ornamental planting, they seem to be inferior to the natives.

Some of the dwarf species, like the beach plum, *Prunus maritima*, and the western sand plum, *Prunus angustifolia watsoni*, are good planted in shrubbery borders. The sand cherries, *Prunus pumila* and *P. pumila besseyi*, are effective used in the same way.

Probably the plum which is most planted by the landscape gardeners of this country is Pissard. It has beautiful pink flowers, but its chief value is in its rich red foliage. A well-grown tree of Pissard is a specimen for any tree collector to be proud of. This variety might well be planted oftener, though a single specimen is usually all that any one place will require. Mr. J. S. Breece of North Carolina has grown some new varieties within the last few years which are possibly mixed with the blood of Pissard, and which certainly have better foliage than that well-known variety. The leaves are larger, better in texture, and a great deal richer in color. The most promising of these varieties are Coleus and Garnet, especially the former.

The black knot has usually been urged as an objection to the use of plum and cherry trees in ornamental planting. If the plantings are to be neglected, this objection becomes of some importance; but if they are to have good care the black knot is no more of a

menace than it is in the orchard of the careful plum grower. In other words, it is not worth considering.

In planting plums for ornamental effect, it should be remembered that some of the named varieties are much more desirable than others. Trees should therefore be selected from the catalog with the same care used in making up a list of varieties for orchard planting. Moreover, this gives the opportunity to get trees grafted on non-sprouting stocks, and that is a considerable advantage on lawns or in parks.

The varieties especially recommended for ornamental planting by the writer are as follows:

Japanese group.—Ogon, Chabot, Maru, Engre.

Americana group.—Kerr's double, Deepcreek.

Miner group.—Miner, Forestrose.

Nigra group.—Cheney, August.

Wayland group.—Wayland, Moreman, Reed.

Wildgoose group.—Wooten, Downing, Milton.

Chicasaw group.—Newman, Arkansas, Ogeechee, Pottawattamie.

Watsoni group.—Strawberry.

For foliage.—Coleus, Pissard, Garnet.

GENERAL INDEX

PAGE

Affinities of varieties 297
Alleghany plum 89
Americana group 48
plum, technical description . 15
stocks 245
Aphis 342
Apple tent caterpillar 346
Apricot as a stock 245
plum 38
plum, technical description . 14
Beach plum 86
technical description 17
Bird cherry 18
Black cherry, technical description 18
Black knot 320
Bladders 326
Blossoming chart . . . 288-296
seasons 286
Borers 344
Botany of the plums 9
Bradshaw type 27
Budding 238
Bud moth 347
Bullace 31
Bumble flower beetle 347
Burbank, Luther, portrait . . . 78
Butter, plum 356
Canada plum, technical description 15
Canker 334
Cankerworms 346
Canning plums 351
Chicasaw group 70
plum, technical description . 16
stocks 246
Choke cherry, technical description 19
as a stock 248
Classification, botanical . . . 9
in general 5
Climatology 308

PAGE

Compote 351
Cooking plums 350
Cultivation 270
Curculio 339
Curl 326
Curl-leaf 335
Cutting back 276
Cuttings, propagation by . . . 238
Dame Aubert group 23
Damsons 30
plum, technical description . 14
Defective pistils 283
Description of fruits, forms for 2
of species 14
Diamond type 25
Diseases 317
Distances for planting 270
Domestica plums 20
plum blossoms 21
plums, history 22
Drainage 268
Drying fruit 356
European plum, technical description 14
Exposures 268
Flyspeck fungus 329
Geography and climatology . . 308
Grafting on roots 239
Green Gage group 22
Gummosis 332
Hardiness 308-315
Heading in 274
Home use, varieties for . . . 258
Horse plum for stocks 242
Hybrid plums 79
Impotency of pollen 285
Insects 338
Irrigation 271
Jam 256
Japanese plums 42
technical description 14
Jelly 354

PAGE

Juice of plums, cooking . . . 355
June drop 305
Kerr, J. W., portrait 11
Layers, propagation by 237
Lazy Club rules for nomenclature 4
Lecanium scale 343
Leaf rust 328
Leaf-spot fungus 323
Lichens 331
Lombard type 27
Management in orchard and garden 265
Marianna, history of 36
stocks 244
Marketing 280
Market varieties 253
Marmalade 356
Mice 348
Mildew 330
Miner group 57
technical description 15
Model home orchards 260
Monilia fructigena 317
Mutual affinities 297
Myrobalan group 35
plum, technical description . 14
stocks 243
Nigra group 54
plum, technical description . 15
Nomenclature, rules for . . . 4
Oklahoma plum 89
technical description 17
Orchard and garden management 265
Ornamental use of plum trees . 358
Pacific plum 88
technical description 17
as a stock 247
Peach as a stock 244
Perdrigons 25
Phenology 315
Phoma 329
Picking fruit 280
Pickled plums 354
Pin cherry 18
Planting trees 269
Plum trees as ornamental plants 358
Pockets 326
Pollen, amount produced . . . 299
insufficient 284
Pollination 282
agencies of 305
Domesticas and Damsons . . 305
Pollenizing chart 301-304
Powdery mildew 330
Preserves 352
Propagation 235
Proterandry and proterogyny . 284
Prunes 24
Pruning 272
Prunus, technical description . 13
alleghaniensis 17-89
americana 15

PAGE

Prunus—Continued.
americana double . . . 360-361
americana mollis 15
americana nigra 15
angustifolia 16
angustifolia watsoni 16
besseyi 18-91
capuli 19
caroliniana 19
cerasifera 14
cuneata 18
demissa 19
domestica 14
domestica damascena . . . 14
gracilis 17-89
gravesii 87
hortulana 15-16
hortulana mineri 15
injucunda 87
insititia 31
maritima 17-86
pennsylvanica 18
pumila 18-92
pumila besseyi 18-91
pumila besseyi as a stock . 247
rivularis 15
salicifolia 19
serotina 18
serotina as a stock 248
serotina salicifolia 19
simonii 14-38
spinosa 14-33
subcordata 17-88
subcordata as a stock . . . 247
triflora 14
umbellata 17-91
virginiana 19
virginiana demissa 19
Red spider 347
Reine Claude group 22
Ripe rot 317
Rust of foliage 328
Sand cherry for stocks 247
Sand plum 74
technical description 16
as a stock 246
San Jose scale 344
Scab 327
Scale insect 343-344
Seed, plums from 236
Selection of varieties 251
Self-sterility 283
Serving fruit uncooked . . . 356
Shot-hole fungus 323
Side-grafting 230
Simon plum 38
technical description 14
Single-tree disease 336
Sloe, European 14-33
Soils 267
Spiced plums 353
Spraying 278
St. Julien for stocks 242
Stocks from seed 236

	PAGE
Stratification of plum pits	236
Suckers for propagation	237
Sunburn of foliage	335
Sunscald	331
Systematic pomology	1
Tent caterpillar	346
Terry, H. A., portrait	71
Thinning fruit	279
Top-working	241
Varieties for ornamental use	263
selection of	251
Wayland, illustration of fruit	65
group	60
technical description	15
seedlings for stocks	247
Whip-grafting	239
Wildgoose group	67
Willard, S. D., portrait	7

INDEX TO VARIETIES

[Synonyms are in *Italics*]

	PAGE		PAGE
Abundance	132	Bean	143
Advance	142	*Beatty*	143
African	192	Beaty	192
Agen	94	*Beaty's Choice*	192
Aitken	169	*Beauty of Naples*	117
Alabama	201	Belle	96
Alhambra	201	*Belle de Septembre*	96
Alice	142	Bender	143
Allen's Yellow	142	Benson	177
Allfruit	202	Berckmans	133
Alpha	229	Berger	133
America	202	Bestovall	204
American Eagle	142	Beta	230
American Golden	177	*Bicksley*	143
Ames	203	Biery	133
Anderson	229	Bittern	96
Anderson's Early Red	229	Bixby	143
Angouleme	95	Blackhawk	143
Apple	203	Blackman	204
Apricot	143	Bleeker	96
Arch Duke	95	*Bleeker's Gage*	96
Arctic	95	*Blood plum*	140
Arkansas	192-194	Blue Imperatrice	97
Arkansas Lombard	192	*Blue Imperial*	97
Atkins	143	*Blue Magnum Bonum*	107
August	169	Bluemont	230
Babcock	133	Boddaert	97
Bailey	115	*Boddaert's Green Gage*	97
Bailey	134	*Bolmer*	125
Baraboo	143	Bomberger	144
Bartlett	204	Botan	134
Bassett	229	*Botan*	132
Bassett's American	229	Bradshaw	97
Bavay	96	Brainerd	144
Bavay's Green Gage	96	*Brainerd's Best*	144

	PAGE
Breck	204
Brill	230
Brittlewood	144
Brittlewood No. 2	165
Bryan	144
Bryanston	98
Bryanston's Gage	98
Budd	144
Burbank	134
Bursoto	144
Caddo Chief	193
California	145
Caper	205
Captain	177
Captain Watrous	165
Carver	145
Cel	205
Chabot	134-135
Chalco	206
Champion	145
Charles Downing	185
Chase	132
Cheney	169-170
Cherokee	145
Cherry	230
Chicrigland	206
Chippeway	145
Choptank	184
Christie	145
City	146
Clara	184
Clark	193
Clifford	184
Climax	206
Clinton	172
Cloth of Gold	100
Cluck	194
Cluster (Damson)	127-128
Clyman	98
Coe's Golden Drop	104
Coletta	194
Coleus	206
Colonel Wilder	175
Colorado	146
Colorado Queen	146
Columbia	98
Columbia	177
Comfort	146
Communia	98
Compass cherry	207
Comptine	146
Cook	230
Cook's Choice	146
Copper	98
Corymbus	207
Cottrell	146
Couler	230
Crable	232
Crescent City	172
Crimson	170
Crimson Beauty	178
Culberson	208
Cumberland	178
Cyclone	146
Czar	99
Dahlgren	147
Daisy	208
Dame Aubert	125
Daniel Weeping	209
Danish Damson	127
Datte d'Hongrie	109
Davis	185
Deaton	99-100
DeCaisne	100
DeCaradeuc	230
Decker	172
Deepcreek	147
Delaware	134
Dennis	147
Des Moines	147
DeSoto	147
Diamond	100-101
Diamond	231
Diana	148
Douglas	135
Douglas	132
Downing	185
Drap d'Or	100
Dr. Dennis	147
Drouth King	194
Duane	100-102
Duane's Purple	100
Dunlap	185
Dunlap No. 1	148
Dwarf Rocky Mountain cherry	231
Earliest of All	135
Early Cherry	230
Early Honey	195
Early Red	195
Ebon	231
Eldora	148
Ellis	231
El Paso	192
Emerald	209
Emerson	195
Emerson	173
Emerson Yellow	195
Emily May	101
Emma	148
Englebert	101-103
Engre	136
Erby's September	181
Esther	173
Etta	148
Eugen Furst	127-129
Excelsior	209-210
Fairchild	148
Fanning	185
Fawn	231
Fellenburg	111
Field	101
Fonthill	118
Forest Garden	148
Forest Rose	173
Forewattamie	210
Fotheringham	102

	PAGE
Franklin	210-211
Freeman	186
Free Silver	149
Freestone (Damson)	129
French (Damson)	129
French Prune	94
Frogmore	130
Frostproof	231
Fuller	232
Gale	149
Galena	149
Galopin	102
Garden King	149
Garfield	179
Garnet	211
Gates	149
Gaylord	149
Giant	102
Giant Prune	102
Georgia	212
General Hand	108
German Prune	102
German Prune Seedling	157
Glass	104
Gold	150
Gold	213
Georgeson	136
Gold-Colored	150
Golden	212-213
Golden Beauty	179
Golden Drop	104
Golden Prune	105
Golden Queen	160
Goliath	105
Gonzales	213-214
Govalle	215
Grace	150
Grand Duke	106
Grayson	215
Green Gage	106
Gueii	107
Haag	150
Halcyon	215
Hale	136
Hammer	150
Hand	108
Hanson	151
Harlow	108
Harney	108
Harrison	170
Harrison's Peach	170
Hart	151
Hart's DeSoto	151
Hartwick	151
Hattankio	137
Hattonkin	136
Hattie	232
Hawkeye	151
Heep	195
Heikes	137
Heron	108
Hiawatha	152
Hilltop	152
Hoffman	195
Holland	215
Hollister	185-186
Holt	152
Homestead	153
Honey	153
Honeydrop	181
Honey Grove	200
Hoskins	232
Hudson	109
Hudson River Purple Egg	109
Hughes	195-196
Hulings	109
Hulings' Superb	109
Hungarian	109
Hungarian Prune	109
Hunn	137
Hunt	153
Ickworth	110
Ickworth Imperatrice	110
Ida	153
Idall	173
Idol	173
Illinois Ironclad	154
Imperial Gage	111
Indiana	173
Indian Chief	186
Iola	232
Iona	153
Iowa	153
Iowa Beauty	153
Irby	181
Irene	154
Iris	173
Ironclad	154
Isaac	154
Isabella	154
Italian Prune	111
Itaska	171
Ithaca	232
Ivason	154
James Vick	180
Jaune Hative	112
J. B. Rue	163
Jefferson	112
Jennie Lucas	196
Jessie	154
Jewell	186
Joe Hooker	154
Jones	154
Jones Late	155
Juicy	216
Kampeska	155
Kanawha	180-181
Kelly	186
Kelsey	137
Kerr	137
Kicab	232
Kickapoo	155
Kieth	155
Kingston	112-113
Klondike	155
Knudson	155
Knudson's Peach	155
Kopp	155
Kroh	186
Labert	155

	PAGE
Labert's Red	155
Lafayette	112
Lancaster	186
Langsdon	181
Lannix	216
LaPrairie	155
Large Red Sweet	160
Late Conical	217
Late Rollingstone	155
Lawrence	112
Lawrence's Favorite	112
LeDuc	156
LeDuc Vermillion	165
Leipsic	113
Leonard	156
Leptune	181
Lewis	113
Lillie	156
Lincoln	114
Lockey	156
Lombard	114
Lone Star	196
Longfruit	138
Longworth	115
Lottie	156
Louisa	156
Louisiana	217
Lucombe's Nonsuch	117
Ludor	196
Lyon	115
Macedonia	186
Mackland	157
Magnum Bonum	125
Manitoba	157
Mankato	157
Maquoketa	173
Marble	217
Marcellus	157
Marcus	157
Marianna	232
Marion	157
Marketman	138
Maru	138
Mary	157
Maryland	218
Mason	196
Maynard	218
McCartney	197
McLaughlin	115-116
McPherson	197
Melon	157
Merunka	115
Merunka	113
Middleburg	116
Mikado	136
Miles	232
Mills	116
Milton	187
Miner	173
Minnetonka	157
Minnie	219
Mirabelle	233
Mississippi	187-188
Mississippi Red	187
Missouri Apricot	181
Moldavka	116
Mollie	158
Monarch	116
Monolith	219
Monon	158
Monona	233
Monroe	116
Monroe Egg	116
Monroe Gage	116
Moon	158
Moore's Arctic	95
Moreman	181
Mrs. Cleveland	187
Mule	219
Muncy	158
Munson	197
Munson	135
Murdy	117
Mussey	158
Naples	117
Nebraska	174
Nebraska Wonder	167
Nellie	158
Nellie Blanche	158
Neverfail	158
Newman	197-198
Newton Egg	158
New Ulm	158
Niagara	97
Nikko	219
Nimon	181
Nona	219-220
Nonsuch	117
North Carolina	159
North Star	159
Noyes	159
Occident	221
Ocheeda	159
October	139
October Purple	139
Odegard	171
Ogeechee	197
Ogon	139
Ohio	187
Ohio Prolific	187
Okaw	233
Old Gold	159
Ollie	221
Omega	159
Oren	174
Orleans	117
Osage	188
Oullin	117
Oullin's Green Gage	117
Owatonna	159
Oxford	171
Pacific	117
Palmer	140
Paquet	118
Paris Belle	189
Parker	233
Parsons	173
Peach	118
Peachleaf	182
Pearl	118

	PAGE
Pearl	233
Peffer Premium	160
Pendent	221
Penning	160
Penning's Free	160
Pennock	222
Peters	118
Peters' Yellow Gage	118
Petite Prune	94
Pilot	160
Piper	233
Piper's Peach	233
Piram	197
Plunk	160
Pond	118-119
Pond's Seedling	118
Pontotoc	182
Poole	186
Poole's Pride	186
Pottawattamie	199
Potter	233
Prairie Flower	175
Preserver	223
President	222-223
Presley	223
Pride	119
Prince Englebert	101
Prince of Wales	125
Prince's Yellow Gage	126
Prof. Budd	144
Prolific	136
Prune d'Agen	94
Prune Peche	118
Prunus Simonii	234
Purple Favorite	119
Purple Gage	119
Purple Panhandle	233
Purple Yosemite	160
Quackenboss	119
Quaker	160
Quality	160
Queen	160
Quetsche de Hongrie	109
Rachel	175
Ragland	223
Rareripe	233
Ray	224
Red June	140
Red Magnum Bonum	117
Red May	224
Red Nagate	140
Red Panhandle	233
Reed	182
Reel	161
Reine Claude	96
Reine Claude d'Angouleme	95
Reine Claude de Bavay	96
Reine Claude Violette	119
Richland	119
Robe de Sergeant	121
Robinson	199
Rockford	161
Rocky Mountain	162
Rollingstone	162
Roselle	162
Roulette	188
Royal	206
Royale Hative	121
Royal Tours	120-121
Ruby	224
Rue	163
Sada	163
Sanders	200
Saratoga	121
Satin	225
Satsuma	140
Schley	188
Schley's Large Red	188
Scribner	225
Sea Egg	140
Seper	171
Seper's Peach	171
Sergeant	121
Sharp	122-123
Sharp's Emperor	122
Shipper	138
Shippers' Pride	119
Shiro	225
Shiro-Smomo	140
Shropshire (Damson)	130
Silas Wilson	163
Silver Prune	104
Simon	234
Sirocco	225
Sloe	164
Smiley	188
Smith	163-164
Smith Red	171
Smith's Orleans	117
Snooks	164
Sophie	189
Spanish	122
Spanish King	115
Spaulding	122
Speer	164
Stanton	122
St. Catherine	121
Steinman	234
Stella	164
Stickney	234
St. Julien	122
St. Lawrence	122
Stoddard	164-165
Stoneless	130
Strawberry	234
Strawberry	133
Sucker State	182
Sugar	124
Sultan	221
Surprise	175
Suwanee	189
Sweet Botan	133
Tatge	124
Tennant	124
Texas Belle	189
Theresa	234
Thousand-and-one	189
Tragedy	124
Transparent	124
Transparent	186

	PAGE
Transparent Gage	124
Trostle	234
Truro	164
Tucker	190
Uchi-Beni	133
Ungarish	109
Union	124
Union Purple	124
U. S.	165
Utah Hybrid	225
Van Buren	165
Van Deman	165
Van Houten	190
Vermillion	165
Victoria	122
Violette de Galopin	102
Virgie	226
Vulcan	226-227
Wady	234
Wady's Early	234
Wales	125
Wangenheim	125
Warren	165
Washington	125
Wasse-Sumomo	135
Wassu	140
Watrous	165
Watson	227
Wayland	182
Wazata	171
Weaver	166
Weeping Blood	140
Whitaker	190
White Damson	131
White Kelsey	136
Wickson	227
Wier	175
Wier's Large Red	175
Wilder	175
Wildgoose	190
Wildgoose, Yellow	190
Wildrose	166
Willard	140
Williams	171
Winnebago	166
Wolf	167
Wonder	167
Wood	168
Wooster	191
Wooten	191
Worldbeater	182
Worth	121
Wyant	167-168
Yates	228
Yeddo	136
Yellow Egg	125-126
Yellow Gage	126
Yellow Japan	134
Yellow Oregon	183
Yellow Panhandle	234
Yellow Sweet	168
Yellow Transparent	200
Yellow Wildgoose	190
Yellow Yosemite	168
Yosebe	135
Zulu	227-228
Zwetsche Ungarische	110

Commended by the Greatest Educators of Germany, England and the United States. Endorsed by Officials, and adopted in many Schools

New Methods in Education

Art, Real Manual Training, Nature Study. Explaining Processes whereby Hand, Eye and Mind are Educated by Means that Conserve Vitality and Develop a Union of Thought and Action

By J. Liberty Tadd

Director of the Public School of Industrial Art, of Manual Training and Art in the R. C. High School, and in several Night Schools, Member of the Art Club, Sketch Club, and Educational Club, and of the Academy of Natural Sciences, Philadelphia

BASED on twenty-two years' experience with thousands of children and hundreds of teachers. "A method reasonable, feasible and without great cost, adapted to all grades, from child to adult; a plan that can be applied without friction to every kind of educational institution or to the family, and limited only by the capacity of the individual; a method covered by natural law, working with the absolute precision of nature itself; a process that unfolds the capacities of children as unfold the leaves and flowers; a system that teaches the pupils that they are in the plan and part of life, and enables them to work out their own salvation on the true lines of design and work as illustrated in every natural thing."

A Wealth of Illustration—478 Pictures and 44 Full-Page Plates showing children and teachers practicing these new methods or their work. A revelation to all interested in developing the wonderful capabilities of young or old. The pictures instantly fascinate every child, imbuing it with a desire to do likewise. Teachers and parents at once become enthusiastic and delighted over the Tadd methods which this book enables them to put into practice Not a backneyed thought nor a stale picture. Fresh, new, practical, scientific, inspiring

AMONG THOSE WHO ENDORSE THE WORK ARE

HERBERT SPENCER DR. W. W. KEENE, PRESIDENT HUEY—Of the Philadelphia board of education.
SECRETARY GOTZE—Of the leading pedagogical society of Germany (by which the book is being translated into German for publication at Berlin).
CHARLES H. THURBER—Professor of Pedagogy, University of Chicago.
TALCOTT WILLIAMS—Editor Philadelphia Press, Book News, etc.
R. H. WEBSTER—Superintendent of Schools, San Francisco.
DR. A. E. WINSHIP—Editor Journal of Education.
W. F. SLOCUM—President Colorado College.
FREDERICK WINSOR—Head master The Country School for Boys of Baltimore City, under the auspices of Johns Hopkins University.
G. B. MORRISON—Principal Manual Training High School, Kansas City.
DR. EDWARD KIRK—Dean University of Penn.
G. E. DAWSON—(Clark University), Professor of Psychology, Bible Normal College.
ROMAN STEINER—Baltimore.

SPECIFICATIONS: Size, 7½x10¼ inches, almost a quarto; 456 pages, fine plate paper, beautifully bound in cloth and boards, cover illuminated in gold; weight, 4¼ lbs. Boxed, price **$3.00 net**, postpaid to any part of the world.

Orange Judd Company

New York, N. Y., 52-54 Lafayette Place. Springfield, Mass., Homestead Bl'k Chicago, Ill., Marquette Building.

SENT FREE ON APPLICATION

Descriptive Catalog of---

Containing 100 8vo. pages, profusely illustrated, and giving full descriptions of the best works on the following subjects:

RURAL BOOKS

Farm and Garden
Fruits, Flowers, Etc.
Cattle, Sheep and Swine
Dogs, Horses, Riding, Etc.
Poultry, Pigeons and Bees
Angling and Fishing
Boating, Canoeing and Sailing
Field Sports and Natural History
Hunting, Shooting, Etc.
Architecture and Building
Landscape Gardening
Household and Miscellaneous

Publishers and Importers

Orange Judd Company

52 and 54 Lafayette Place
NEW YORK

BOOKS WILL BE FORWARDED, POSTPAID, ON RECEIPT OF PRICE

Greenhouse Construction.

By Prof. L. R. Taft. A complete treatise on greenhouse structures and arrangements of the various forms and styles of plant houses for professional florists as well as amateurs. All the best and most approved structures are so fully and clearly described that anyone who desires to build a greenhouse will have no difficulty in determining the kind best suited to his purpose. The modern and most successful methods of heating and ventilating are fully treated upon. Special chapters are devoted to houses used for the growing of one kind of plants exclusively. The construction of hotbeds and frames receives appropriate attention. Over one hundred excellent illustrations, specially engraved for this work, make every point clear to the reader and add considerably to the artistic appearance of the book. Cloth, 12mo. $1.50

Greenhouse Management.

By L. R. Taft. This book forms an almost indispensable companion volume to Greenhouse Construction. In it the author gives the results of his many years' experience, together with that of the most successful florists and gardeners, in the management of growing plants under glass. So minute and practical are the various systems and methods of growing and forcing roses, violets, carnations, and all the most important florists' plants, as well as fruits and vegetables described, that by a careful study of this work and the following of its teachings, failure is almost impossible. Illustrated. Cloth, 12mo. $1.50

Bulbs and Tuberous-Rooted Plants.

By C. L. Allen. A complete treatise on the history, description, methods of propagation and full directions for the successful culture of bulbs in the garden, dwelling and greenhouse. As generally treated, bulbs are an expensive luxury, while when properly managed, they afford the greatest amount of pleasure at the least cost. The author of this book has for many years made bulb growing a specialty, and is a recognized authority on their cultivation and management. The illustrations which embellish this work have been drawn from nature, and have been engraved especially for this book. The cultural directions are plainly stated, practical and to the point. Cloth, 12mo. $1.50

Irrigation Farming.

By Lute Wilcox. A handbook for the practical application of water in the production of crops. A complete treatise on water supply, canal construction, reservoirs and ponds, pipes for irrigation purposes, flumes and their structure, methods of applying water, irrigation of field crops, the garden, the orchard and vineyard; windmills and pumps, appliances and contrivances. Profusely, handsomely illustrated. Cloth, 12mo. . . $1.50

Landscape Gardening.

By F. A. Waugh, professor of horticulture, University of Vermont. A treatise on the general principles governing outdoor art; with sundry suggestions for their application in the commoner problems of gardening. Every paragraph is short, terse and to the point, giving perfect clearness to the discussions at all points. In spite of the natural difficulty of presenting abstract principles the whole matter is made entirely plain even to the inexperienced reader. Illustrated, 12mo. Cloth. . $ .50

Fungi and Fungicides.

By Prof. Clarence M. Weed. A practical manual concerning the fungous diseases of cultivated plants and the means of preventing their ravages. The author has endeavored to give such a concise account of the most important facts relating to these as will enable the cultivator to combat them intelligently. 222 pp., 90 ill., 12mo. Paper, 50 cents; cloth. $1.00

Talks on Manure.

By Joseph Harris, M. S. A series of familiar and practical talks between the author and the deacon, the doctor, and other neighbors, on the whole subject of manures and fertilizers; including a chapter especially written for it by Sir John Bennet Lawes of Rothamsted, England. Cloth, 12mo. $1.50

Insects and Insecticides.

By Clarence M. Weed, D. Sc., Prof. of entomology and zoology, New Hampshire college of agriculture. A practical manual concerning noxious insects, and methods of preventing their injuries. 334 pages, with many illustrations. Cloth, 12mo. $1.50

Mushrooms. How to Grow Them.

By Wm. Falconer. This is the most practical work on the subject ever written, and the only book on growing mushrooms published in America. The author describes how he grows mushrooms, and how they are grown for profit by the leading market gardeners, and for home use by the most successful private growers. Engravings drawn from nature expressly for this work. Cloth. $1.00

Handbook of Plants and General Horticulture.

By Peter Henderson. This new edition comprises about 50 per cent. more genera than the former one, and embraces the botanical name, derivation, natural order, etc., together with a short history of the different genera, concise instructions for their propagation and culture, and all the leading local or common English names, together with a comprehensive glossary of botanical and technical terms. Plain instructions are also given for the cultivation of the principal vegetables, fruits and flowers. Cloth, large 8vo. $3.00

Ginseng, Its Cultivation, Harvesting, Marketing and Market Value.

By Maurice G. Kains, with a short account of its history and botany. It discusses in a practical way how to begin with either seed or roots, soil, climate and location, preparation, planting and maintenance of the beds, artificial propagation, manures, enemies, selection for market and for improvement, preparation for sale, and the profits that may be expected. This booklet is concisely written, well and profusely illustrated, and should be in the hands of all who expect to grow this drug to supply the export trade, and to add a new and profitable industry to their farms and gardens, without interfering with the regular work. 12mo. . . . . $ .35

Land Draining.

A handbook for farmers on the principles and practice of draining, by Manly Miles, giving the results of his extended experience in laying tile drains. The directions for the laying out and the construction of tile drains will enable the farmer to avoid the errors of imperfect construction, and the disappointment that must necessarily follow. This manual for practical farmers will also be found convenient for references in regard to many questions that may arise in crop growing, aside from the special subjects of drainage of which it treats. Cloth, 12mo. $1.00

Henderson's Practical Floriculture.

By Peter Henderson. A guide to the successful propagation and cultivation of florists' plants. The work is not one for florists and gardeners only, but the amateur's wants are constantly kept in mind, and we have a very complete treatise on the cultivation of flowers under glass, or in the open air, suited to those who grow flowers for pleasure as well as those who make them a matter of trade. Beautifully illustrated. New and enlarged edition. Cloth, 12mo. $1.50

Tobacco Leaf.

By J. B. Killebrew and Herbert Myrick. Its Culture and Cure, Marketing and Manufacture. A practical handbook on the most approved methods in growing, harvesting, curing, packing, and selling tobacco, with an account of the operations in every department of tobacco manufacture. The contents of this book are based on actual experiments in field, curing barn, packing house, factory and laboratory. It is the only work of the kind in existence, and is destined to be the standard practical and scientific authority on the whole subject of tobacco for many years. Upwards of 500 pages and 150 original engravings. $2.00

Play and Profit in My Garden.

By E. P. Roe. The author takes us to his garden on the rocky hillsides in the vicinity of West Point, and shows us how out of it, after four years' experience, he evoked a profit of $1,000, and this while carrying on pastoral and literary labor. It is very rarely that so much literary taste and skill are mated to so much agricultural experience and good sense. Cloth, 12mo. . . $1.00

Forest Planting.

By H. Nicholas Jarchow, LL. D. A treatise on the care of woodlands and the restoration of the denuded timberlands on plains and mountains. The author has fully described those European methods which have proved to be most useful in maintaining the superb forests of the old world. This experience has been adapted to the different climates and trees of America, full instructions being given for forest planting of our various kinds of soil and subsoil, whether on mountain or valley. Illustrated, 12mo. $1.50

Soils and Crops of the Farm.

By George E. Morrow, M. A., and Thomas F. Hunt. The methods of making available the plant food in the soil are described in popular language. A short history of each of the farm crops is accompanied by a discussion of its culture. The useful discoveries of science are explained as applied in the most approved methods of culture. Illustrated. Cloth, 12mo. $1.00

American Fruit Culturist.

By John J. Thomas. Containing practical directions for the propagation and culture of all the fruits adapted to the United States. Twentieth thoroughly revised and greatly enlarged edition by Wm. H. S. Wood. This new edition makes the work practically almost a new book, containing everything pertaining to large and small fruits as well as sub-tropical and tropical fruits. Richly illustrated by nearly 800 engravings. 758 pp., 12mo. $2.50

Fertilizers.

By Edward B. Voorhees, director of the New Jersey Agricultural Experiment Station. It has been the aim of the author to point out the underlying principles and to discuss the important subjects connected with the use of fertilizer materials. The natural fertility of the soil, the functions of manures and fertilizers, and the need of artificial fertilizers are exhaustively discussed. Separate chapters are devoted to the various fertilizing elements, to the purchase, chemical analyses, methods of using fertilizers, and the best fertilizers for each of the most important field, garden and orchard crops.
335 pp. $1.00

Gardening for Profit.

By Peter Henderson. The standard work on market and family gardening. The successful experience of the author for more than thirty years, and his willingness to tell, as he does in this work, the secret of his success for the benefit of others, enables him to give most valuable information. The book is profusely illustrated. Cloth, 12mo. $1.50

Herbert's Hints to Horse Keepers.

By the late Henry William Herbert (Frank Forester). This is one of the best and most popular works on the horse prepared in this country. A complete manual for horsemen, embracing: How to breed a horse; how to buy a horse; how to break a horse; how to use a horse; how to feed a horse; how to physic a horse (allopathy or homoeopathy); how to groom a horse; how to drive a horse; how to ride a horse, etc. Beautifully illustrated. Cloth, 12mo. $1.50

Barn Plans and Outbuildings.

Two hundred and fifty-seven illustrations. A most valuable work, full of ideas, hints, suggestions, plans, etc., for the construction of barns and outbuildings, by practical writers. Chapters are devoted to the economic erection and use of barns, grain barns, house barns, cattle barns, sheep barns, corn houses, smoke houses, ice houses, pig pens, granaries, etc. There are likewise chapters on bird houses, dog houses, tool sheds, ventilators, roofs and roofing, doors and fastenings, workshops, poultry houses, manure sheds, barnyards, root pits, etc. Cloth, 12mo. $1.00

Cranberry Culture.

By Joseph J. White. Contents: Natural history, history of cultivation, choice of location, preparing the ground, planting the vines, management of meadows, flooding, enemies and difficulties overcome, picking, keeping, profit and loss. Cloth, 12mo. $1.00

Ornamental Gardening for Americans.

By Elias A. Long, landscape architect. A treatise on beautifying homes, rural districts and cemeteries. A plain and practical work with numerous illustrations and instructions so plain that they may be readily followed. Illustrated. Cloth, 12mo. $1.50

Grape Culturist.

By A. S. Fuller. This is one of the very best of works on the culture of the hardy grapes, with full directions for all departments of propagation, culture, etc., with 150 excellent engravings, illustrating planting, training, grafting, etc. Cloth, 12mo. $1.50

Turkeys and How to Grow Them.

Edited by Herbert Myrick. A treatise on the natural history and origin of the name of turkeys; the various breeds, the best methods to insure success in the business of turkey growing. With essays from practical turkey growers in different parts of the United States and Canada. Copiously illustrated. Cloth, 12mo. . . $1 00

Profits i Poultry.

Useful and ornamental breeds and their profitable management. This excellent work contains the combined experience of a number of practical men in all departments of poultry raising. It is profusely illustrated and forms a unique and important addition to our poultry literature. Cloth, 12mo. $1.00

How Crops Grow.

By Prof. Samuel W. Johnson of Yale College. New and revised edition. A treatise on the chemical composition, structure and life of the plant. This book is a guide to the knowledge of agricultural plants, their composition, their structure and modes of development and growth; of the complex organization of plants, and the use of the parts; the germination of seeds, and the food of plants obtained both from the air and the soil. The book is indispensable to all real students of agriculture. With numerous illustrations and tables of analysis. Cloth, 12mo. $1.50

Coburn's Swine Husbandry.

By F. D. Coburn. New, revised and enlarged edition. The breeding, rearing, and management of swine, and the prevention and treatment of their diseases. It is the fullest and freshest compendium relating to swine breeding yet offered. Cloth, 12mo. $1.50

Stewart's Shepherd's Manual.

By Henry Stewart. A valuable practical treatise on the sheep for American farmers and sheep growers. It is so plain that a farmer or a farmer's son who has never kept a sheep, may learn from its pages how to manage a flock successfully, and yet so complete that even the experienced shepherd may gather many suggestions from it. The results of personal experience of some years with the characters of the various modern breeds of sheep, and the sheep raising capabilities of many portions of our extensive territory and that of Canada—and the careful study of the diseases to which our sheep are chiefly subject, with those by which they may eventually be afflicted through unforeseen accidents—as well as the methods of management called for under our circumstances, are carefully described. Illustrated. Cloth, 12mo. $1.00

Feeds and Feeding.

By W. A. Henry. This handbook for students and stockmen constitutes a compendium of practical and useful knowledge on plant growth and animal nutrition, feeding stuffs, feeding animals and every detail pertaining to this important subject. It is thorough, accurate and reliable, and is the most valuable contribution to live stock literature in many years. All the latest and best information is clearly and systematically presented, making the work indispensable to every owner of live stock. 658 pages, 8vo. Cloth. $2.00

Hunter and Trapper.

By Halsey Thrasher, an old and experienced sportsman. The best modes of hunting and trapping are fully explained, and foxes, deer, bears, etc., fall into his traps readily by following his directions. Cloth, 12mo. $ .50

The Ice Crop.

By Theron L. Hiles. How to harvest, ship and use ice. A complete, practical treatise for farmers, dairymen, ice dealers, produce shippers, meat packers, cold storers, and all interested in ice houses, cold storage, and the handling or use of ice in any way. Including many recipes for iced dishes and beverages. The book is illustrated by cuts of the tools and machinery used in cutting and storing ice, and the different forms of ice houses and cold storage buildings. 122 pp., ill., 16mo. Cloth. $1.00

Practical Forestry.

By Andrew S. Fuller. A treatise on the propagation, planting and cultivation, with descriptions and the botanical and popular names of all the indigenous trees of the United States, and notes on a large number of the most valuable exotic species. $1.50

Irrigation for the Farm, Garden and Orchard.

By Henry Stewart. This work is offered to those American farmers and other cultivators of the soil who, from painful experience, can readily appreciate the losses which result from the scarcity of water at critical periods. Fully illustrated. Cloth, 12mo. $1.00

Market Gardening and Farm Notes.

By Burnett Landreth. Experiences and observation for both North and South, of interest to the amateur gardener, trucker and farmer. A novel feature of the book is the calendar of farm and garden operations for each month of the year; the chapters on fertilizers, transplanting, succession and rotation of crops, the packing, shipping and marketing of vegetables will be especially useful to market gardeners. Cloth, 12mo. . . $1.00

634.22 W35P

a39001 007444402b

634.22
W35p

1-22